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Volume XXVI - No. 12 December, 1953

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A.S.M. Annual Meeting

Reports of the President, Secretary and Treasurer; and Election of Officers

THE ANNUAL MEETING of the Amercian Society for Metals was held in Cleveland on Wednesday morning, Oct. 21, 1953, during the National Metal Congress and Exposition.

President Wilson presented the slate of new officers nominated last May (see *Metals Review*, June, 1953). No additional nominations having been received, the secretary cast the unanimous vote of the members for these candidates.

Annual reports of the president, treasurer and secretary were presented, and are reproduced in summary below. They will be published in full in the next volume of the A.S.M. *Transactions*.

PRESIDENT'S REPORT

Presented by Ralph L. Wilson
Retiring A. S. M. President

YOUR Society has enjoyed another successful year in all respects. The main objectives in the field of education and in chapter activities remain unchanged and splendid accomplishments can be reported.

The Officers and Trustees of your Society have had an unusually busy year. There were four meetings of the Board of Trustees: Nov. 6, 1952, Mar. 24, Aug. 27 and 28, and Oct. 20, in 1953. Your President has given talks before 31 chapters, taken part in four regional meetings, attended the Western Metal Congress, and presented an address at the close of the Intersession Course in Metals Technology at the State Teachers College in Oswego, N. Y.

Every member of the Board of Trustees has accepted speaking assignments before our local chapters. Aside from the vists made by your President, the other Trustees gave the high total of 29 talks. While the strength of our Society resides in the energy with which activities are carried on at the local chapter level, it is good to know that such a close relationship exists between the National Office and the various chapters. In the course of the year charters were granted to three new chapters—New Orleans, The Carolinas, and Jacksonville. A petition is also pending from a group in the Savannah River Region in Georgia.

The Western Metal Congress was held in Los Angeles Mar. 23 to 27, 1953. This was easily the largest and best Metal Show ever staged on the West Coast. For that matter, it was the biggest industrial show of any kind to be held in that region. Registrations and attendance were at record-breaking highs. The attractive exhibits were on the same scale of display as in the National Exposition. For the first time the A.S.M. technical sessions offered programs of papers that had been arranged by the Publications Committee of the Society. Participation by local sections and chapters of other technical societies helped to make the Congress a great success.

It is with sadness that we record the loss of one of our illustrious past presidents. Charles H. Herty, Jr., died in Bethlehem, Pa., on Jan. 17, 1953. He was president of the Society in 1946 and had received many honors for his contributions to metallurgy. We shall all miss his friendliness and enthusiasm.

Continuing the recent practice of having regional conferences with the newly elected chairmen and vice-chairmen, the following chapter groups met with the national secretary, and in some instances another member of the Board of Trustees, in all-day sessions to discuss local and national activities of the Society:

South Central—Columbus, Cincinnati, Dayton, Louisville

Southern — Georgia, Birmingham, Chattanooga, New Orleans, Oak Ridge, Jacksonville, Carolinas

Indiana—Indianapolis, Notre Dame, Purdue, Terre Haute, Muncie, Ft. Wayne

Lower Lakes—Rochester, Buffalo, Eastern New York, Ontario, Rome, Southern Tier, Syracuse, Western Ontario

Midwest — Kansas City, North Texas, Rocky Mountain (Denver and Pueblo), St. Louis, Texas, Tulsa, Wichita

Central — Calumet, Cedar Rapids, Chicago, Des Moines, Milwaukee, Minnesota, Peoria, Rockford, Tri-City.

These conferences have proven helpful in leading to exchanges of experiences in handling chapter affairs, in scheduling meetings and in obtaining speakers.

Acta Metallurgica, the new International Journal of Metal Science, for which the Society is still the only financial sponsor, beginning with the January 1953 issue, has been distributed regularly every two months to about 2100 subscribers. Good papers are coming in at the rate of 15 to 20 per month, many being from outside the United States. This is more than enough material to maintain the schedule of publication.

The A.S.M. Visiting Lectureships were established a year ago to provide speakers for seminars at the colleges. Since then applications have been filed and arrangements completed at eight schools for lecturers of their own choice. The expenses, including an honorarium, were borne by the Society. In the opinion of your Trustees, the service rendered to higher education by these lectureships justified the renewal of the appropriation. However, a proviso was included that seminars should be at least two-day meetings. Under this plan, Alan H. Cottrell, the distinguished professor at the University of Birmingham in England, has been brought to America to take part in the A. S. M. Seminar of the Metal Congress and to lecture at nine colleges during his stay in this country.

Recently the grant from the National Office to three or more chapters holding a regional meeting was raised from $200 to $300 to cover the higher present cost of organizing and publicizing such gatherings. In order to stimulate interest in more varied programs, your Trustees have approved a grant of $500 to any group of chapters planning to have two-day or longer meetings. This has been an exceptionally good year for regional meetings both from the standpoint of originality and attendance. Tri-City Chapter at Davenport, Iowa, and the Birmingham Chapter both held two-day meetings with four neighboring chapters, and Rochester was host to six other chapters in a three-day meeting.

Your National Committee for Vocational Education, under the chairmanship of William F. Collins, has done outstanding work in arranging for the Intersession Course in Metals Technology sponsored by the A.S.M. at the State Teachers College, Os-

wego, N. Y. Drawing upon previous experiences at Fitchburg State Teachers College in Massachusetts and in the vocational schools of New Jersey, a course of study was planned to encourage vocational and technical high-school teachers to become interested in teaching metals technology. Three of the teachers who attended the Oswego course are in the process of writing a textbook intended for students in the vocational and technical high schools. A similar course for teachers sponsored by the Society was conducted at Fitchburg State Teachers College last summer with equally satisfactory results. The Bureau of Industrial Education, State of California, will sponsor, in cooperation with the A.S.M., a series of lectures at the Pasadena City College starting on Nov. 2 of this year.

On behalf of the American Society for Metals, I want to thank the cooperating societies for the part they have taken in making this National Metal Congress a success. The American Institute of Mining and Metallurgical Engineers (Institute of Metals Division), the American Welding Society, and the Society for Nondestructive Testing have increased the breadth of interest immeasurably by their programs.

No President's report would be complete without the sincere words of praise that are always earned by our Secretary, Bill Eisenman, who has devoted himself so unselfishly to the welfare of our Society and its members. As an able and efficient manager he has brought the A.S.M. to a strong and enviable position. To Bill, his associates, and the entire staff at the National Headquarters, I want to express my appreciation for their splendid support on so many occasions.

SECRETARY'S REPORT

Presented by W. H. Eisenman
Secretary, American Society for Metals

The American Society for Metals on Oct. 1, 1953, had a total membership of 23,011, a gain of 6.5% since last October.

Of this number 19,721 are regular members, 1090 are junior members, and 2102 are sustaining members.

There are 51 honorary and life members and 47 members in the armed forces.

Publications Committee — Seventeen persons constitute the membership of the Publications Committee for 1953, under the chairmanship of W. E. Mahin, technical director, Vanadium Corp. of America.

During the year the Committee has reviewed 82 papers. Of this number 59 were approved for publication in *Transactions,* 38 were selected for presentation at the October National Metal Congress, 16 for presentation at the Midwinter Meeting to be held in Boston in March 1954 (these papers were preprinted) and the balance of 5 for publication in *Transactions* only.

The Publications Committee held one formal meeting on June 23 and 24, 1953, at which time the final arrangements for the technical program at this Convention were made.

Educational Committee—The Educational Committee (M. J. Day, Chicago, chairman), held one formal meeting on Dec. 19, 1952, at which time the educational lectures for this Convention were discussed and the status of the manuscripts reported. The lectures for the 1954 Convention were arranged. These lectures are:

1. Surface Protection Against Wear, by Howard S. Avery, J. M. Hosdowich, Michael B. Bever, Howard Vanderpool and T. Gaynor.

2. Surface Protection Against Corrosion, by Clarence C. Harvey, A. J. Liebman, Arnold J. Eickhoff, Kenneth Tator, Joseph Bigos, H. A. Robinson, H. S. Ingham and Fielding Ogburn.

3. Fatigue, by T. J. Dolan, B. J. Lazan and O. J. Horger.

The subjects for 1954 are: (a) Furnace Atmospheres. (b) Temperature Measurement. (c) Simplified Plastic Flow and Fracture, and possibly, (d) Embrittlement Phenomenon.

Considerable footage has already been made of the motion picture film "Heat Treatment of Steel" which is being sponsored by the Committee and being produced by the photographic department of Ohio State University and the film will be completed early in December 1953.

Metals Handbook Committee—Active work is underway on the *Metals Handbook.* In order to publish new and revised information as soon as possible, the Handbook Committee is preparing first a 1954 Supplement to the present edition.

The organization has been strengthened by appointment of Carl H. Gerlach as A.S.M. Staff Engineer assigned to the Metals Handbook Committee.

A steady demand continues for the 1948 edition, presently in its third printing.

Special Libraries Association—For the past three years members of the Special Libraries Association interested in metals have been assembling for a national meeting during the Metal Congress. Largely as a result of this active interest in their subject field, these members have now formed a full-fledged "Metals Division" of the Association. The Metals Division met this year in conjunction with the Metals Section of the Science Technology Division.

The meetings centered primarily on the subject of literature sources for the newer metals and modern fabrication techniques.

The Society is again sponsoring a booth at the Metal Exposition designed as a miniature working library and reference service, and manned by librarians and information specialists trained in metallurgy and related engineering sciences.

Transactions—Since the last National Metal Congress, Vol. 45 and Vol. 45A of the *Transactions* were published and distributed to the membership in March 1953. Volume 45 totals 1122 pages and constitutes 49 articles with their discussions. It contains all of the papers presented at the October 1952 Convention held in Philadelphia, together with some of the papers presented at the Eighth Western Metal Congress held in Los Angeles, March 1953, and also the interim papers received during the year. The president, secretary and treasurer's reports for 1952 and other current items of record were included in Vol. 45, together with a report of the Convention.

Volume 45A contains 14 papers (325 pages) presented at the Seminar on "Modern Research Techniques in Physical Metallurgy" held during the National Metal Congress and Expositon, Philadelphia. This seminar was sponsored by the American Society for Metals, the subject being selected by a committee appointed by the Board of Trustees, (R. M. Brick, chairman).

Preprints — Thirty-eight papers were prepared in preprint form for presentation at this Convention and 15 for the Midwinter meeting to be held in Boston in March 1954. These preprints were distributed to those members of the Society who requested them. The total number of pages is 1033 and a total of 45,000 preprint copies was distributed.

Metal Progress—The number of editorial pages published during the 12 months completed in August 1953 reached an all-time high of 853—a 26% increase over the preceding 12 months. This expanded editorial coverage has been made possible by an accompanying increase in advertising pages of 17.8% for the same period. Much of this additional editorial space has been absorbed by the publication of "digests" of important articles published elsewhere.

A significant event during the year was the establishment of an annual "International Issue" reviewing metallurgical progress throughout the civilized world. The first such collection of world-wide metallurgy appeared in January 1953, and consisted of a series of articles written by prominent engineers in the countries of Europe, England, Japan and Australia, each writing about postwar developments in his field of competence. To insure a continuing flow of authoritative material of this

type in subsequent New Year issues, the editor spent two months in Europe interviewing prospective authors and mapping out areas of information to be surveyed.

On the physical side, steps have been taken to maintain the place *Metal Progress* has occupied through the years as an example of typographical superiority and attractive appearance. To keep the magazine thoroughly up-to-date in these respects, an entirely new and modern series of type faces has been introduced and color has appeared in the editorial pages for the first time. Another change in the mechanical work of getting out the magazine has been a change of printer from Tower Press in Cleveland, which has produced *Metal Progress* from the first, to Kable Printing Co. in Mt. Morris, Ill.

Special commendation was accorded by *Metal Progress* readers to two series of articles—a group on metallurgy of zirconium appearing in May, and several articles on cold extrusion of steel in the August issue. So much new material has also been contributed on the subject of boron steels that a new edition of the A.S.M. pamphlet by that title has been issued in revised and greatly expanded form.

Metals Review — During the 12 months from October 1952 through September 1953, *Metals Review* published a total of 600 pages—100 less than the preceding 12 months. Of the 600 pages, 56% were devoted to news of chapter activities, doings of members and headquarters actions; 44% were devoted to A.S.M. Review of Metal Literature.

The Society published for the third time the biographies and photographs of the junior members to assist them in obtaining employment during the coming year.

Material usually contained in the Metal Show Section, heretofore published in the September issue, was published this year in the *Metal Showman*. A new feature, "Meet Your Chapter Chairman", in which informal biographies and photographs of the various chapter chairmen were published, was inaugurated this year and will continue.

The 9th volume of the *A.S.M. Review of Metal Literature*, containing 977 pages and 9438 annotations, was published.

Books—During the past year, a total of 25,790 books published by the Society was sold to members and others. This figure includes 1836 copies of the 1948 *Metals Handbook*.

During this period nine titles were added to the publication list. These are: Transactions of the A.S.M., Vol. 45; Cast Bronze—by H. J. Roast; Modern Research Techniques in Physical Metallurgy—Seminar by 16 authors; Behavior of Metals at Low Temperatures — by three authors; Gases in Metals—by four authors; Structure and Properties of Mild Steel, by C. A. Edwards; Zirconium and Zirconium Alloys—by 32 authors; Review of Metal Literature—Vol. 9; and Revision of "Principles of Heat Treatment"—by M. A. Grossmann.

The following title is now in preparation: Revision of "Engineering Alloys", by N. E. Woldman.

Seminar—The Seminar on Relation of Properties to Microstructure (Morris Cohen, chairman), was an outstanding success. It was divided into five important and interesting sessions with the meeting room filled to capacity.

Service to Junior Members—Again this year junior members received special attention. They have had the opportunity to purchase many of the books published by the Society at greatly reduced rates; and they were notified of the availability of 2068 openings for summer employment. The February edition of the *Metals Review* carrying photographs and biographies of graduating junior members, was distributed to employers of engineering talent.

Young Engineers' Day—Following the practice initiated at Philadelphia last year, the A.S.M. has again instituted a Young Engineers' Day at the National Metal Exposition. Friday of this week, Oct. 23, has been designated for this activity and the educational institutions having departments of engineering have been invited to be the guests of the Society on that day. The institutions in this vicinity have been visited and the A.S.M. representative has been most cordially received and the response most gratifying. The A.S.M. absorbed the entire transportation expense and the engineers were guests of the Society at a luncheon served at the Public Auditorium.

A.S.M. Science Achievement Awards—These awards, sponsored by the A.S.M., are conducted by the National Science Teachers Association, a division of the National Education Association. The second year of operation has just been completed with the filing of the names and addresses of the 214 winners of awards totaling $6000.

TREASURER'S REPORT

Presented by Ralph L. Dowdell
Head, Department of Metallurgy
University of Minnesota

This report on your Society covers the fiscal year ending Aug. 31, 1953. This was again a year of efficient operation.

On closing the year, Aug. 31, 1953, the carrying value of all securities including interest accrued was $1,643,017.48, which is an increase over last year of $218,806.52.

The approximate market value of securities, including accrued interest on bonds, was $1,793,205.94 on Aug. 31, which represents an appreciation in dollar value of $150,188.46.

The cash account was decreased $15,629.12 from last year, so that more funds could be invested. There has been no fundamental change in investment policy for the portfolio over the past year.

Dividends and interest earned amounted to $62,400.43, or about 3.82%, based on the carrying value of the total securities as compared to about 3.98% for the preceding year. With a lower proportion of corporate stocks, the yield has been slightly lowered.

Corporate stocks constitute about 28.4% of the total investments, while last year they constituted about 30% of the total holdings.

Total income and expense for the year ending Aug. 31, 1953, are:

Income	$1,749,225.26	
Expense	1,486,357.66	
Net Income		$ 262,867.60
Appropriated for Educational Purposes.	$ 137,867.60	
Appropriated for Building Site and Building	125,000.00	
Total Appropriations		$ 262,867.60
Unappropriated Net Income		$0,000,000.00

	Income	Disposition of Income
Metal Progress	38%	35%
Metal Expositions	34	20
Membership—Gross Dues	14	..
Returned to Chapters	..	6
Expense	..	3
Books Publishing	4	4
Interest and Dividends	3	..
METALS HANDBOOK	2	2
Metals Review	2	3
Sales of Securities	1	..
TRANSACTIONS	1	3
General Administration	..	9
Educational Projects	..	7
Fund for Building Site and Building	..	7
Miscellaneous	1	1
	100	100

The gross income from dues was $256,895.55, of which $106,700.80 was returned to local chapters. After accounting for our membership expense we have a net income from dues of $95,552.04.

A high source of income was from interest earned on investments and was $62,400.43.

Both *Transactions* and *Metals Review* are not self-supporting and were distributed to the membership at a net cost to the Society of about $35,759.86 and $22,420.73.

The large disposition item for Educational Projects is shown below:

	1953
ASM Foundation for Education and Research	$ 1,846.10
Teaching Awards	7,500.00
Chapter Educational Activities	15,000.00
Second World Metallurgical Congress	50,000.00
Program with National Science Teachers' Association	15,000.00
ASM Visiting Lectureship	8,000.00
New Headquarters' Site	75,000.00
Building Fund	50,000.00
METALS HANDBOOK Revision	30,000.00
Journal of Science	10,521.50
	$262,867.60

The present net assets of the A.S.M. are approximately $2,390,283.05 which is an increase of $285,646.90 over last year.

The combined assets of the 85 local chapters have risen to about $272,000, which is an increase of about $24,000 over the previous year.

Appointments to A.S.M. Standing Committees

At the meeting of the Board of Trustees of the American Society for Metals held Nov. 10, new appointments to the various national committees of the Society were announced by President Austin and confirmed by the Board. The complete personnel of the standing committees is listed below. The new appointments are shown in italics and the numerals represent the date of expiration of the appointment. Chapter affiliations are listed rather than employment addresses.

Constitution and By-Laws Committee

J. C. Neemes, Jr., International Nickel Co., Minnesota, '54, Chairman.
T. M. LaCrone, Lindberg Engineering Co., Kalamazoo, '55.
D. W. Thompson, General Electric Co., Fort Wayne, '55.
W. Mack Crook, Consulting Engineer, Texas, '56.
R. E. Layton, O. A. Sutton Corp., Wichita, '56.
G. A. Roberts, Representative of the A.S.M. Board of Trustees.

Finance Committee

W. A. Pennington, Carrier Corp., '54, Chairman, (A.S.M. Treasurer).
B. B. Bullwinkle, Tuerck MacKenzie Co., Oregon, '54.
Zay Jeffries, Pittsfield, Mass., '54.
K. R. Van Horn, Aluminum Co. of America, Pittsburgh, '55.
Clyde Williams, Battelle Memorial Institute, Columbus, '55.
A. B. Kinzel, Union Carbide & Carbon Research Laboratory, Inc., New York, '56.
A. A. Hess, A.S.M. Assistant Treasurer, Cleveland, '56.
F. R. Morral, Kaiser Aluminum & Chemical Corp., Inland Empire, '56.

Publications Committee

F. T. McGuire, Deere & Co., Tri-City, '54, Chairman.
W. W. Austin, Jr., North Carolina State College, Carolinas, '54.
R. D. Chapman, Chrysler Corp., Engineering Division, Detroit, '54.
A. H. Geisler, General Electric Co., Eastern New York, '54.
P. Payson, Crucible Steel Co. of America, New York, '54.
J. W. Spretnak, Ohio State University, Columbus, '54.
B. L. Averbach, Massachusetts Institute of Technology, Boston, '55.
J. A. Berger, University of Pittsburgh, Pittsburgh, '55.
W. O. Binder, Electro Metallurgical Co., Buffalo, '55.
J. L. Gregg, Cornell University, Southern Tier, '55.
G. V. Smith, U. S. Steel Corp., New Jersey, '55.
H. S. Avery, American Brake Shoe Co., New York, '56.
D. J. Carney, U. S. Steel Corp., Chicago, '56.
Karl Fetters, Youngstown Sheet & Tube Co., Mahoning Valley, '56.
W. L. Finlay, Rem-Cru Titanium, Inc., Pittsburgh, '56.
W. D. Manly, Oak Ridge National Laboratory, Oak Ridge, '56.

Educationl Committee

F. G. Tatnall, Baldwin-Lima-Hamilton Corp., Philadelphia, '54, Chairman.
A. M. Bounds, Superior Tube Co., Philadelphia, '54.
N. C. Jessen, Babcock & Wilcox Co., Akron, '54.
C. H. Lorig, Battelle Memorial Institute, Columbus, '54.
Otto Zmeskal, Illinois Institute of Technology, Chicago, '54.
W. J. Buechling, Copperweld Steel Co., Warren, '55.
J. M. Edge, Tennessee Coal & Iron Div.-U. S. Steel Corp., Birmingham, '55.
R. S. Guinan, Eastman Kodak Co., Rochester, '56.
H. J. Smith, International Harvester Co., Louisville, '56.

(Continued on following page)

David Turnbull

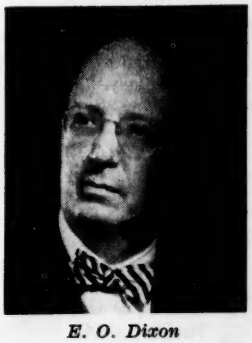
These Men Are the Newly Appointed Chairmen of the Following A.S.M. Standing Committees: David Turnbull, Seminar Committee; Joseph F. Libsch, Advisory Committee on Metallurgical Education; Francis T. McGuire, Publications Committee; Francis G. Tatnall, Educational Committee; E. O. Dixon, Metals Handbook Committee; and W. C. Collins, Vocational Education

W. C. Collins

Joseph Libsch

Francis McGuire

F. G. Tatnall



E. O. Dixon

Metal Progress Advisory Committee

E. E. Thum, Editor, *Metal Progress*, Cleveland.
J. B. Austin, President, A.S.M.
G. A. Roberts, Vice-President, A.S.M.
W. H. Eisenman, Secretary, A.S.M.
F. S. Badger, Jr., Haynes Stellite Co., Indianapolis, '54.
L. S. Fletcher, Sam Tour Co., Inc., New York, '54.
L. Shapiro, Douglas Aircraft Co., Inc., Los Angeles, '54.
J. L. Christie, Handy & Harman, New Haven, '55.
R. G. Roshong, Heintz Manufacturing Co., Philadelphia, '55.
Frank G. Foote, Argonne National Laboratory, Chicago, '56.

Advisory Committee on Metallurgical Education

J. F. Libsch, Lehigh University, Lehigh Valley, '54, Chairman.
W. E. Mahin, Vanadium Corp. of America, Cambridge, Ohio, '54.
J. P. Nielsen, New York University, New York, '54.
Frank Forward, University of British Columbia, British Columbia, '55.
J. C. Holmberg, Douglas Aircraft Co., Tulsa, '55.
A. J. Shaler, Pennsylvania State University, Penn State, '55.
G. A. Fisher, Jr., International Nickel Co., St. Louis, '56.
H. E. Flanders, University of Utah, Utah, '56.
E. Eugene Stansbury, Monsanto Chemical Co., Oak Ridge, '56
R. J. Raudebaugh, Atlanta, Representative of the A.S.M. Board of Trustees.

Vocational Education Committee

W. F. Collins, United Carr Fastener Co., Boston, '54, Chairman.
G. F. Kappelt, Bell Aircraft Corp., Buffalo, '54.
A. R. Kommel, United Engineering and Foundry Co., Pittsburgh, '54.
R. C. Onan, Waukee Engineering Co., Inc., Milwaukee, '54.
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W. C. Schulte, Curtiss Wright Corp., New Jersey, '55.
T. J. Hughel, Purdue University, Purdue, '56.
R. L. Wilson, Representative of the A.S.M. Board of Trustees.
J. F. Libsch, Lehigh University (ex officio).

Metals Handbook Committee

E. O. Dixon, Ladish Co., Milwaukee, '54, Chairman.
O. E. Cullen, Surface Combustion Corp., Toledo, '54.
T. E. Eagan, Cooper Bessemer Corp., Mahoning Valley, '54.
B. W. Gonser, Battelle Memorial Institute, Columbus, '54.
Max Hansen, Armour Research Foundation, Chicago, '54.
N. E. Promisel, U. S. Navy Bureau of Aeronautics, Washington, '54.
Robert Sergeson, Crucible Steel Co. of America, Detroit, '54.
L. H. Winkler, Bethlehem Steel Co., Lehigh Valley, '54.
L. E. Simon, Electro-Motive Div., General Motors Corp., Chicago, '55.
S. F. Urban, Titanium Alloy Mfg. Div., National Lead Co., Buffalo, '55.
W. L. Badger, General Electric Co. Boston, '56.
F. R. Anderson, Gardner-Denver Co., Rocky Mountain, '56.

Seminar Committee

David Turnbull, General Electric Co., '54, Chairman.
Harvey Brooks, Harvard University, Boston, '54.
Bruce Chalmers, Harvard University, Boston, '54.
L. K. Jetter, Oak Ridge National Laboratory, Oak Ridge, '54.
P. A. Beck, University of Illinois, '55.
E. S. Machin, Columbia University, New York, '55.
O. T. Marzke, Naval Research Laboratory, Washington, '55.
Frederick Seitz, University of Illinois, '55.
R. L. Cunningham, Canadian Bureau of Mines, Ottawa Valley, '56.
Eric Jette, Los Alamos Scientific Laboratory, Los Alamos, '56.
R. Maddin, Johns Hopkins University, Baltimore, '56.
Arthur S. Nowick, Yale University, New Haven, '56.

Carboloy Opens Magnet Plant

Edmore, Mich., with a population of 800, will soon become the magnet center of the country.

In October, the Carboloy Department of General Electric Co., Detroit, opened its new magnet plant in the heart of Michigan's resort and hunting area. The plant will employ about 450 persons including many of Edmore's 800 citizens.

Push-button controlled operations are spread over nearly two acres of floor space. Permanent magnets of an aluminum-nickel-cobalt alloy made here will be used both in industry and the home. Some 2200 types of magnets will be produced for uses ranging from military radar and radio to magnetic hardware for kitchen cabinets. The latest innovations in transforming metal powders into solid metals, and shaping molten metal by foundry operations will be used in production.

Firth Sterling To Open Plant

Firth Sterling Inc. has announced that it is installing a major facility for the melting and rolling of zirconium and zirconium alloys with the production to be made available for general industrial use.

Vacuum melting furnaces with an annual capacity of 360,000 lb. are being installed at the company's Trafford (Pa.) plant which will convert zirconium sponge to zirconium ingots. The metal will be made available in billets, bars, rods, strip, sheets, wire and tubing. Most of the conversion from ingot to rolled product will be carried on at the McKeesport, Pa., plant which has been rolling and drawing this materials for over two years.

Technical Papers Invited for A.S.M. Transactions

The Publications Committee of the A.S.M. will now receive technical papers for consideration for publication in the 1955 *Transactions* and probable presentation before a national meeting of the Society. A cordial invitation is extended to all members and nonmembers of the A.S.M. to submit technical papers to the Society.

Many of the papers approved by the Committee will be scheduled for presentation on the technical program of the 36th National Metal Congress and Exposition to be held in Chicago, Nov. 1-5, 1954, and the Western Metal Congress, Los Angeles, May 21-25, 1955. Papers that are selected for presentation will be printed and manuscripts should be received at A.S.M. headquarters office not later than April 10, 1954.

Acceptance of a paper for publication does not necessarily infer that it will be presented. The selection of approved papers for the convention program will be made early in June.

Manuscripts in triplicate, plus one set of unmounted photographs and original tracings, should be sent to the attention of Ray T. Bayless, assistant secretary, American Society for Metals, 7301 Euclid Ave., Cleveland 3, Ohio.

Headquarters should be notified of your intention to submit a paper, and helpful suggestions for the preparation of technical papers will be sent.

Carolinas Receives Chapter Bell

National Secretary W. H. Eisenman Presented the Chapter Bell to the Carolinas Chapter at a Recent Meeting. Shown are, from left: James McElgin, guest speaker; Bill Brinkley, E. F. Houghton & Co.; Al Fairchild, chapter chairman; and Mr. Eisenman. Mr. McElgin spoke on "Heat Treating Practices"

Speaker: James McElgin

E. F. Houghton & Co.

The Carolinas Chapter heard National Secretary, William H. Eisenman, give a brief history of the American Society of Metals for new members and guests at its first meeting this season. Following a talk on his recent European trip, Mr. Eisenman presented the Chapter's Bell and Gavel to Al Fairchild, chairman

The guest speaker, James McElgin of E. F. Houghton & Co., spoke on "Heat Treating Practices". He covered hardening or softening of steels for various applications. Some of the points covered were: annealing to increase machinability, carburizing, tempering, critical cooling rate, methods of quenching, martempering and austempering. He also discussed quenching agents such as water, the various oils, salt and caustic soda and the soda bath. His talk was followed by a brief question and answer period.—**Reported by James J. Hairston, Engineer of Manufacture, North Carolina Works, Western Electric Co.**

Notre Dame Chapter Hears Discussion on Powder Metallurgy

Speaker: D. B. Martin

Vice-President, Amplex Div. Chrysler Corp.

D. B. Martin, vice-president, Amplex Division, Chrysler Corp., gave a talk before the Notre Dame Chapter on "Powder Metallurgy".

Chrysler became interested in powder metallurgy because of the fact that a powder metal bearing was so successful on the clutch bearing application. From this humble start they have grown to the position that they have 20,000 different stock sizes of bearings alone. Mr. Martin stated that their sizes will range from 10,000 parts to the pound to one part weighing 250 pounds.

Chrysler fabricates the following types of parts out of powder metals using the common metals iron, copper, zinc, tin, aluminum and nickel, lead, stainless steel and nickel silver.

A. Oilite Bearings
B. Oilite Machine Parts
C. Oilite Filters
D. Oilite Friction Units
E. Oilite Electrical Parts.

Compacting pressures range from 15,000 to 100,000 psi. depending upon the inherent porosity they wish to have in the piece.

Mesh size of the powder metal averages 250 mesh with a range of 100 on the coarse side to 325 mesh size on the fine side.

Chrysler has been very successful in increasing the percent elongation of their powder metal parts in the last few years.

Processing in their plant is roughly as follows after the powders have been mixed by one or more of the accepted methods:

1. A 3 to 1 compression ratio is used in pressing the part or briquette.
2. Sintered in furnace at proper temperature and atmosphere for the alloy used.
3. Sized in coining press.
4. Impregnated with oil.

Slides were shown of the plant operation at the Amplex Division and sample parts were on display for the examination by the membership. —**Reported by R. C. Pocock, Chief Engineer, Eng. Research Lab., Bendix Products Div.**

Philippine Journey Described by Speaker

Speaker: W. W. Staley

Professor of Mining University of Idaho

W. W. Staley, professor of mining at the University of Idaho, showed colored slides and described "Open-Pit Mining Activities in the Philippines" to nearly 65 members of the Inland Empire Chapters of A.S.M. and A.I.M.E. at a recent meeting.

Prof. Staley was sent last year to the Islands by the Mutual Security Agency to reorganize the mining school at the University of the Philippines. He spoke of seeing iron ore from open-pit mines loaded onto trucks by the natives using bare hands only, while a nearby power shovel stood idle. As a result, only about half a ton of ore per day is handled by the Philippine open-pit miners. Underground mining is done with machinery, however, and costs less to produce. The miners receive about $2 a day in wages. The ore, shipped to Japan for processing, is worth about 15 pesos ($7.50) a ton.

Prof. Staley traveled extensively over the Islands and gave a few highlights of his journey, showing color slides of old churches and monuments, as well as the jungle, coral reefs and the natives in their habitat. —**Reported by Helen Goerig, Kaiser Aluminum and Chemical Corp.**

Investment Castings Topic Of North Texas Discussion

Speaker: John D. McConnell

International Nickel Co.

North Texas Chapter was host to John McConnell, sales manager, precision investment castings department, International Nickel Co., at its October meeting.

Mr. McConnell's talk "Precision Investment Castings" emphasized the field that investment castings would fill in the future and showed slides. Limitations of the process were noted and the speaker pointed out that this process was another method of forming metals to supplement other well-known methods such as forging, sand casting, etc. Several parts were exhibited to illustrate the talk.—**Reported by Irving H. Comroe, Metallurgical Consultant.**

Part Electricity Plays in Industry Cited by Speaker

Speaker: A. J. F. MacQueen
Superintendent, Electrical Dept.
Algoma Steel Corp., Ltd.

Northern Ontario Chapter heard A. J. F. MacQueen present an informative talk on "Electricity in Industry" at the October meeting. Mr. MacQueen, superintendent of Algoma Steel's electrical department since 1943, prefaced his discussion with a review of electrical definitions commonly encountered in industry, and drew mechanical analogies to illustrate the basic characteristics of electricity.

The phenomenon that makes power generation possible is that a metallic conductor, when moved through a magnetic field, will develop a voltage across the conductor. Conversely, a conductor to which a voltage is applied while in a magnetic field will tend to be moved through that field. In this manner, mechanical energy may be converted into electrical power and back again.

A prime use of electrical power involves its conversion into mechanical energy. The selection of electric motors to fit the conditions and the job is a major consideration. Mr. MacQueen discussed five important criteria for the selection of a motor best suited to a particular job:

(1) Direct current or alternating current. This choice is determined by the type of current available, initial cost of equipment and controls, cost of power generation, and the motor characteristics desired.

(2) Voltage. The voltage selected depends upon the horsepower requirements, and the most desirable balance of copper costs, insulation costs, and current losses.

(3) Frequency. Determined by motor speed requirements.

(4) Speed and load. Alternating current motors, such as the synchronous, squirrel-cage, and wound rotor motors, have inherent constant speed characteristics. Direct current, shunt-wound motors offer almost constant speed regardless of load, but will allow the speed to be regulated. Series-wound direct current motors have the advantage of high torque at low speeds.

(5) Enclosures. These are generally divided into open, drip-proof, totally enclosed, and totally enclosed, fan-cooled types.

In order to do an intelligent job of applying electrical equipment to industrial requirements, it is essential to know and evaluate all the pertinent factors and select the equipment that strikes the most economical balance among these figures.

Mr. MacQueen concluded his talk with a brief discussion of electrical protection, power distribution and power factor regulation.—**Reported by J. G. Underwood, Algoma Steel Corp.**

Georgia Hears of Need For Trained Personnel

Speaker: Robert S. Lynch
President
Atlantic Steel Co.

The Georgia Chapter heard Robert S. Lynch, president of Atlantic Steel Co., talk on "Modern Industry's Need for Trained Personnel" at its first meeting this season. Mr. Lynch stressed the responsibility of industry to cooperate with educators at all levels to give students insight into the various specialized talents needed in modern industry.

Special guests for the evening were Mrs. M. Gordon Brown, supervisor of science training, Atlanta public schools, science teachers and students from Atlanta public schools and students of Georgia Tech.

Robert J. Raudebaugh, chairman, Georgia Chapter, and A. S. M. trustee, announced the Georgia winners in the Science Achievement Award Program. They were: Jack Venable, Northside High School; Billy Wright and Don Hartwig, North Fulton High School; Jerry Ayers and Richard Dix, Brown High School; Horace Hissman, Howard High School; and Nancy Willson, Laboratory High School, Collegeboro, Ga.

Chairman Raudebaugh appointed members of the Georgia Chapter to join the principals and science teachers of these students to present the awards in appropriate student services at their respective schools.—**Reported by Fred O. Reese, Atlantic Steel Co.**

Predicts Coming Uses for Titanium

Speaker: Thomas W. Lippert
Manager of Sales & Technical Service
Titanium Metals Corp. of America

At the first meeting of the Toledo Chapter this season, members heard Thomas W. Lippert give an interesting talk on the "Significance and Trend of Titanium Development".

Although a commercial titanium industry is not much over three years old, great progress has been made in the development of this metal. In this short length of time titanium has actually jumped from the experimental laboratory to use on some of the most difficult applications.

Pure titanium metal and titanium-base alloys are being produced in forgings, bars, sheet, plate, strip, wire and extruded tubing and bars. Mr. Lippert displayed several samples of various shapes and forms during his talk.

The speaker emphasized that the main objective of the industry today is to produce titanium in larger quantities, and consequently, lower the price and broaden the field of application. — **Reported by M. M. Schrecongost, Latrobe Steel Co.**

Rhode Islanders Enjoy Castings Plant Visit

The Rhode Island Chapter Opened the New Season With a Visit to the Arwood Precision Casting Corp., Groton, Conn. Forty-five members took the extensive tour through the plant, and after the tour met with company officials at the Colonial Inn for dinner and discussion, led by Henry Bryk, general manager of the plant. A motion picture on the precision casting process was shown. (Robert Perry, Photographer)

Texas Hears McPherson on Titanium

D. J. McPherson (Center), Supervisor, Physical Metallurgy Research, Armour Research Foundation, Spoke on "The Physical Metallurgy of Titanium" Before the Texas Chapter. He is shown with W. Mack Crook (left), chairman, and A. R. Oakley (right), vice-chairman. (Photograph by L. V. Dolan)

Speaker: D. J. McPherson

Physical Metallurgy Research
Armour Research Foundation

Some of the fundamental studies which are making possible rapid strides in titanium alloy development were described by D. J. McPherson before the Texas Chapter in a talk on "The Physical Metallurgy of Titanium". Dr. McPherson pointed out that constitution diagrams and a knowledge of reaction kinetics are prerequisites for logical alloy development.

Among the many processes proposed for the production of titanium, only one shows current economic possibilities—this involves the reduction of $TiCl_4$ by magnesium, which produces a sponge mass comprising over 99% titanium.

Dr. McPherson discussed the physical and mechanical properties of titanium. The three common types of titanium binary phase diagrams were explained and slides showing examples of each were presented. Two of these types involve lowering the alpha to beta transformation temperature of unalloyed titanium, the third raising it. Unalloyed titanium transforms from hexagonal alpha to body centered cubic beta at 1625° F.

Elements such as iron, chromium and manganese yield the familiar Fe-Fe_3C type of diagram. Molybdenum, vanadium and certain other elements are continuously soluble in beta titanium and stabilize this phase down to room temperature. Aluminum, oxygen and nitrogen raise the transformation temperature and stabilize alpha titanium.

Dr. McPherson stated that such proven tools as T-T-T charts, Jominy and age hardening tests have been put to work in studying transformation kinetics. The correlation of T-T-T charts, microstructures and mechanical properties has done much to point the way to desirable heat treating procedures.

Quenching will produce martensite in many titanium alloys, but Jominy tests show that this rarely yields the highest hardening. The aged condition represents higher property levels for most alloys.

One of the more important properties of titanium is its high strength-weight ratio. In addition to this, titanium is highly resistant to corrosive action, particularly in marine atmospheres.

Dr. McPherson concluded by pointing out that while such studies are continuing, many of the results obtained thus far are being put to good use in all of the laboratories engaged in titanium alloy development—**Reported by D. M. Forney, Jr., Hughes Gun Co.**

Scappoose Pig Iron For Northwest Use Urged by Speaker

Speaker: John P. Walsted

Metallurgist, Bureau of Mines

The Oregon Chapter heard John P. Walsted, metallurgist for the Bureau of Mines, discuss "Pig Iron for the Northwest" at a meeting recently.

Dr. Walsted asked all present to consider Scappoose ore development as a desirable project. With four million tons explored and a potential 20 million tons unexplored, there is every indication that economic operation would be feasible. A daily market of 200 tons would pay off the cost of initial investment. Dr. Walsted emphasized the fact that Scappoose ore is not a cheap grade of ore. Representative samples denote iron content of 38% in the natural state, and after reduction in electric furnaces the iron content becomes 47%. This percentage can be increased by further processing. Typical electric furnace charge for each 100 lb. of ore includes 50 lb. of limestone, 50 lb. of hog fuel and 27 lb. of Monarch coal.

A number of tons of pig iron produced at the Bureau of Mines from Scappoose ore has been used by local foundries and proven to be extremely satisfactory.

The coffee speaker, George C. Henriksen, director of adult and vocational education at the Portland Public Schools, gave a talk on the methods by which high-school students are made to realize the importance of industry to them and their own potential importance to industry. Some of the methods cited are: Providing high-school instructors with science kits to stimulate teaching of science to pupils; distribution of pamphlets, such as "Your Career in Science"; science workshops; supplying high school libraries with books on metals and science; and annual "Career Day" programs where industrial leaders give talks to the students.—**Reported by J. E. Gustafson, Bethlehem Pacific Coast Steel Corp.**

Cites Trends in the Development of Titanium

Speaker: Frank H. Vandenburgh

Vice-President and General Manager
Mallory Sharon Titanium Co.

The Akron Chapter heard Frank H. Vandenburgh, Mallory Sharon Titanium Co., discuss "Titanium—a New Horizon in Metallurgy" at a meeting in October. Mr. Vandenburgh discussed the possible uses of titanium over the period of the next ten years.

Bob Wylie, coffee speaker, gave an interesting account of his recent trip through Japan.—**Reported by Richard E. Miller, Industrial Sales, East Ohio Gas Co.**

Company Changes Name

The name of the Topper Equipment Co., Clark Township (Rahway), N. J., manufacturers of vapor degreasers and other metal cleaners and solvents, has been changed to the Circo Equipment Co. Equipment produced by the company has previously borne the trade name "Circo". The change in company title acknowledges the recognition of Circo products through 30 years of experience in the metal-cleaning field. With the name change, both products and company designation will be "Circo".

Hanink Presents Design Factors for Gas Turbine Metals

Speaker: Herman H. Hanink

Mgr., Metallurgical Engineering Wright Aeronautical Division

Saginaw Valley Chapter heard a talk on "Design Factors in Gas Turbine Metallurgy" by Herman H. Hanink at its October meeting. The development of the internal combustion engine was traced from its beginning through the ram jet engine, and the audience was introduced to the important design components of the gas turbine—inlet, compressor, combustion chamber, turbine and nozzle. These components were analyzed in terms of typical temperature/stress conditions for current production models, advanced production models and engines in development. Competitive materials for each component were compared and the trend of material requirements for future designs indicated.

From a design standpoint, Mr. Hanink indicated that the turbo-prop engine offers greater returns than the jet engine from the development of more heat resistant materials than now available, due to its greater increase in power and fuel economy as burner temperatures are increased. To get better performance, compression ratios are increasing with a resultant temperature increase in the compressor air outlet. This places a limitation on some of the materials now used in this component.

From a material standpoint, the alloy for each component is chosen on the basis of existing operating temperatures and stresses, with weight a factor. Materials range from magnesium alloys to high alloy steels. New alloys are presently being developed as the need for them arises in the design of new engines. Such was the case a few years ago of the magnesium rare earth metal alloy, the development of which coincided with the need for an alloy with such properties in the compressor section. New titanium alloys are also finding application in some components.

Stresses considered in the design of components range from creep in the compressor blades to rupture in the turbine rotor blades. Temperatures in the various stages may range from 550° F. in the compressor to 2100° F. in the burner of engines in development. The wide range of stresses and temperatures in a single engine emphasized the problems of the design engineer in choosing materials to meet these requirements.

Prior to Mr. Hanink's talk, 17 past chairmen of the Chapter were honored at the meeting, and 26 new members and 8 transferees were introduced and welcomed. — **Reported by N. Sheptak, Metallurgical Laboratories, Dow Chemical Co.**

Pittsburgh Hears Sixth Andrew Carnegie Lecture

Speaker: L. F. Reinartz

American Rolling Mills Co.

The Sixth Annual Andrew Carnegie Lecture was presented by L. F. Reinartz, American Rolling Mills Co., at the October meeting of the Pittsburgh Chapter. Mr. Reinartz's talk was entitled "The Lengthening Shadow of a Great Man".

Like Andrew Carnegie, G. M. Verity contributed many important features to the steel industry. Mr. Reinartz, who started at Armco as a chemist in 1909, commented on his 34-years association with this man.

Mr. Verity had progressive ideas about personnel relations. No strikes, friendly atmosphere, team work, good working conditions and good relationship between the men and their supervisors prevailed, with Verity a prime example of friendliness.

Armco, which started in 1900, built the business on specialties, such as silicon sheets for armatures and electrical equipment and Armco pure iron. Under Verity's leadership, Armco was first to adopt the 8-hr. day for 12 hours pay. That was in February 1920, three years before the rest of the industry. Its comprehensive, long-range safety program was started in 1912 and has continued to be applied and expanded to meet changing conditions in the industry. They were the first in group insurance in the steel industry, having started this in 1917. Suggestion box ideas of employees in helping production were initiated in 1913.

The continuous sheet mill, built at Ashland, Ky., in 1924 by Armco, was the country's first practical continuous sheet mill.

The American Rolling Mills Co. worked under Verity's leadership for 43 years, and his fair handling of problems between management and workers has prevailed. There have been no strikes against the home plant in Middletown, Ohio, since the plant opened in 1900.—**Reported by H. E. McGannon, Technical Editor, U. S. Steel Corp.**

Chairman Greets His Predecessor

Chairman A. D. Harding (Left), Atlas Steel Ltd., Gets a Few Pointers on How to Run a Chapter From Past Chairman J. A. Underwood, Dominion Oxygen Co., Ltd., at a Recent Meeting Held by the Columbia Basin Chapter A.S.M.

Rolled Alloys, Inc., Expands

Rolled Alloys, Inc., Detroit, has opened new sales offices in Chicago and Philadelphia. Frederick P. Lattin, who has been associated for the past nine years with Steel Sales Corp., has been appointed manager in the Chicago office, and John Maxson, who formerly represented chemical firms in the east, has been appointed manager in Philadelphia.

Rolled Alloys specializes in the warehousing and distribution of chromium and nickel-chromium alloys for use at elevated temperatures. Offices in Bridgeport, Conn., and Los Angeles, Calif., were opened earlier this year.

ABCOR Meeting of Southern Chapters

Attending the ABCOR Meeting in Birmingham Were, Front, From Left: A. R. Fairchild, Carolinas Chairman; J. J. Hairston, Carolinas; H. J. Huester, Jacksonville Chairman; A.S.M. Secretary Eisenman; J. M. Edge, Birmingham Chairman; and J. R. Kattus, Birmingham Vice-Chairman. Back row, from left: R. B. Boswell, New Orleans chairman; L. N. Wall, Chattanooga secretary; J. T. Butler, Georgia vice-chairman; W. D. Manly and P. Patriarca, Oak Ridge chairman and vice-chairman; and R. J. Raudebaugh, chairman of Georgia Chapter

The Birmingham Chapter acted as host for the annual ABCOR Regional Conference held in September. The two-day conference consisted of a morning session for registration and opening of the meeting, an afternoon technical session, and an evening social hour and dinner. The second day was devoted entirely to tours of local plants.

Attendance was very gratifying, Atlanta, Birmingham, Chattanooga and Oak Ridge Chapters being well represented. In addition, visitors from New Orleans, Jacksonville, Florida, and the Carolinas Chapters were welcomed.

The regional meeting was opened by J. M. Edge, host chairman of the Birmingham Chapter. The afternoon session was taken up by the following technical talks:

(1) "Developments in High Alloys for Heat and Corrosion Resistance", by W. D. Manly, Oak Ridge National Laboratories.

(2) "Modern Methods in Oxide Removal from Metal Surfaces", by Ray F. Frings, Ray F. Frings Co.

(3) "Recent Developments in the Casting of Metals", by C. K. Donoho, chief metallurgist, American Cast Iron Pipe Co.

(4) "Manfacture of Wire and Wire Products", by James E. LeCroy, supervisor of metallurgy, Wire Works, T. C. & I. Div., U. S. Steel Corp.

The evening session consisted of a social hour and dinner at which J. R. Trimble, manager, department of metallurgy, inspection and research, T. C. & I. Division of U. S. Steel Corp., was toastmaster, and a speech was given by W. H. Eisenman, secretary of National Chapter, American Society for Metals, the topic of which was "The A.S.M. Looks at Europe".

Plant tours on Friday included:

American Cast Iron Pipe Co., Southern Research Institute, Alabama Metal Lath Co., Anderson Brass Works, Westinghouse Electric Co., Connors Steel Co., Tennessee Coal & Iron Div., U. S. Steel Corp., and Southeastern Metals Co.

The meeting afforded an excellent opportunty for members of the various chapters to become better acquainted and to exchange information on metallurgy and discuss ways and means of further increasing A.S.M. membership in the southeast. **—Reported by Walton P. McCord, Allegheny Ludlum Steel Corp.**

Washington Student Receives Science Award

Presentation of a Science Achievement Award was made in October to J. Paul Reason, a 7th grade student at Banneker Junior High School, Washington, D. C. The winning project was entitled "Photoelectric Cell for Wire-Photo". The award, a $25 E-Bond, was presented by Russell W. Mebs, A.S.M. member, who was introduced by H. N. Arbuthnot, chairman, Washington Chapter.

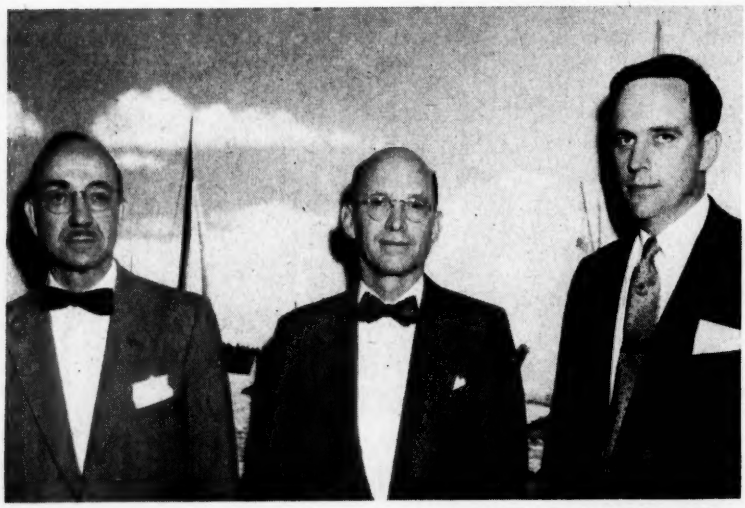
The Science Achievement Awards, conducted by the Future Scientists of America Foundation, is an activity of the National Science Teachers Association. The program is sponsored by the American Society for Metals to help stimulate interest in science at the level of the secondary schools and thus to help to assure adequate scientific personnel to satisfy the needs of the nation in years ahead. **—Reported by R. Raring, Metallurgist, Naval Research Laboratories, Metallurgy Division.**

Alloy Rods Builds in West

Alloy Rods Co., York, Pa., has announced that construction of a new plant has been started in El Segundo, Los Angeles County, Calif. The new plant, to be known as the Pacific Coast Division, will produce a complete line of alloy arc-welding electrodes. It went into operation in October 1953 under the supervision of G. M. Hohmann, now production manager of the York plant.

The Alloy Rods Co., leading manufacturer of alloy arc-welding electrodes in the United States, produces approximately 1/3 of all stainless steel electrodes consumed in this country.

Aborn Presents Woodside Lecture



Robert H. Aborn, Assistant Director of Research, U. S. Steel Corp., Presented the Eleventh Annual William Park Woodside Lecture Before the Detroit Chapter in October. His subject was "Metallurgical Aspects of Modern Stainless Steels". Shown are, from left: Robert Sergeson, technical chairman; Dr. Aborn; and T. E. Olson, chairman of the Detroit Chapter

Speaker: Robert H. Aborn
Assistant Director of Research
U. S. Steel Corp.

Robert H. Aborn presented the eleventh annual William Park Woodside Lecture to the Detroit Chapter in October. The title of his address was "Metallurgical Aspects of Modern Stainless Steels". Dr. Aborn was presented with a plaque to commemorate the event by T. E. Olson, chairman of the Chapter.

Dr. Aborn gave a comprehensive survey of the stainless steel industry beginning with the development period of the 1920's and concluding with the most recent applications of stainless. Rapid increase in demand and progress in manufacturing practices during this period enabled the stainless industry to increase production 20-fold during the past 20 years. Despite its tremendous rate of growth, the application of stainless has not been fully realized as yet as evidenced by the annual two-billion dollar corrosion loss in steel.

Dr. Aborn continued with a brief discussion of the processing of stainless steel, citing the improvements in technique responsible for the rapid advancement of the industry. The primary problem of avoiding intergranular corrosion through proper heat treatment and through the use of columbium, tantalum and titanium was also discussed.

Another major problem encountered by the stainless industry has been the restricted use of nickel, thus requiring the development of substitute steels during the past three years. The talk was concluded with a description of the newest developments and future applications being considered for stainless steels. As so aptly expressed by Dr. Aborn, the stainless steels are certainly the "glamour girls of the steel industry" when treated properly and applied wisely.—**Reported by L. V. Marchetti, DeSoto Division, Chrysler Corp.**

Gives Advantages of Magnesium Alloys

Speaker: John C. McDonald
Assistant Technical Director
Magnesium Dept.
Dow Chemical Co.

The Minnesota Chapter A.S.M. and the Twin City Chapter A.F.S. heard John C. McDonald, assistant technical director of the magnesium department of Dow Chemical Co., speak on "Magnesium Alloys, Their Advantages and Their Limitations" at the October meeting.

Lightness is the chief advantage of magnesium alloys, said the speaker. Lower rigidity due to the lower modulus of elasticity, which varies among structural materials about as the specific weight, would be a drawback if lightness did not facilitate section modulus design to more than offset the lower modulus. Ribs should be suppressed in magnesium design to eliminate stress concentrations. Elongations from 4% to 10% were cited.

Magnesium can be sand cast, die cast, forged, rolled and extruded. It can be gas and arc welded under a protective gas curtain. It can be riveted if separated from contact with dissimilar metals by an electrical barrier to prevent galvanic corrosion in the presence of electrolytes like salt water. Soldering and brazing methods are presently under development, and magnesium alloys are easily machined.

Three alloys of magnesium are in common use: zinc and aluminum, zinc and zirconium, rare earths and zirconium. The zinc aluminum alloy is the cheapest but it does not develop the elastic limit and ductility properties available from the zinc-zirconium, which may reach 25,000 psi yield strength with 6% elongation. Zinc-zirconium alloys have the best extrusion properties.

Magnesium is as unlimited in supply as the oceans from which it is extracted and as universally available, said Dr. McDonald. Cost of production is the chief current limit to broader use of magnesium alloys.—**Reported by K. A. Powell, Research Engineer, Minneapolis-Moline Co.**

New Films

Molded Rubber

A motion-picture story of precision molded rubber parts and products produced by Acushnet Process Co. The film runs 20 minutes and is in color. It graphically depicts each operation in the production of precision-molded rubber and synthetic rubber parts and products. Detailed but concise, yet simply and clearly narrated, the film will appeal to both technical and nontechnical audiences. Information on how to obtain the film can be obtained by writing: Acushnet Process Co., New Bedford, Mass.

Instructor-Student Aids

Three 16-mm. color-sound films on lathe fundamentals produced by the South Bend Lathe Works, South Bend 22, Ind., for use in shop classes to demonstrate the best shop practice in elementary lathe operation. Titles of the films are: "The Lathe", "Plain Turning" and "Grinding Cutter Bits". Further information may be obtained by writing to the company directly. Sound tracks in English, Spanish or French are available.

Lightning Masters

A General Electric movie which has recently been honored at the Edinburgh and the Venice Film Festivals. The picture was produced in Hollywood by R. G. Wolff Studios, sponsored by G.E.'s Transformer Division at Pittsfield, Mass. The film depicts the phenomena of natural lightning and tells the story of lightning research and the development of modern protective equipment. For further information write to: News Bureau, General Electric Co., Schenectady 5, N. Y.

How Large Light Metal Forgings Are Made on Heavy Press

Speaker: A. J. Pepin
Quality and Research Manager
Wyman-Gordon Co.

Springfield Chapter heard A. J. Pepin, aided by slides and a movie, describe "Large Light Metal Forgings Made in the United States' Largest Hydraulic Press".

The Eastern Division of the Wyman-Gordon Co. has operated an 18-000-ton hydraulic forging press since May 1946. Magnesium steel, stainless steel, and titanium alloy forgings have been made, although aluminum alloy forgings have been the primary product. Successful results with this press, along with the knowledge of World War II heavy-press operations in Germany, induced the U.S.A.F. interest in still larger presses. Work is now in progress for a plant to house 35,000 and 50-000-ton Loewy hydraulic forging presses. The building will be 720 ft. long by 400 ft. wide, while another building, 720 ft. sq., will be required for associated facilities.

Heavy presses were developed during World War II in Germany through necessity. Steel and aluminum alloys were in critical supply. Magnesium in the German salt mines was available and the Germans were forced to concentrate on magnesium alloys. High-strength magnesium alloys break up under hammer forging, castings have lower mechanical properties than wrought shapes, so it was natural that the Germans developed press forging to a high level of skill.

On large light alloy forgings, it is necessary to use cast stock because sufficiently large extruded or rolled sections are not available. Cast stock generally requires cross working. The forge furnaces are designed so that the products of combustion are excluded from the heating chamber. The quality of the cast stock must be absolutely the best obtainable to provide satisfactory parts. One of the most critical defects encountered in aluminum alloys is unhealed porosity. This defect is due to hydrogen gas bubbles in the ingot which are forged flat and do not weld. Incoming and in-process inspection must be very critical at all times to avoid severe financial loss because of rejections of finished forgings.

Die blocks, their design, manufacture and heat treatment, present many problems. Obviously, all problems of raw material and manufacture will be aggravated on forgings which will be made from ingots as large as 30 in. square on the 50,000 ton press.

Grain flow in forgings must be carefully controlled. Proper die lubrication is also very important. Up to 30 coupons or other sections may be taken from large forgings to inspect for grain flow, structure and mechanical properties. Each new large forging is an experimental development. Major problems are presented in every phase of experimental and operational stages for the production of these mammoth light metal forgings. Despite all the problems that must be surmounted, the speaker felt that in the next five years forgings of a size to dwarf the largest produced today will be in production. — **Reported by A. L. Shields, Manager, Materials and Process Engineering, Westinghouse Electric Corp.**

Steel Man Changes Alliance

Thomas F. Ewing, who for 18 years has been associated with the steel business, has recently formed a partnership known as Drotleff, Ewing & Co., in San Carlos, Calif., which is concerned with the industrial and investment end of the real estate business. The company deals with property in the San Francisco Bay area. Mr. Ewing was vice-president and co-owner of Coulter Steel and Forge Co. before forming this partnership.

Technical Papers Ready

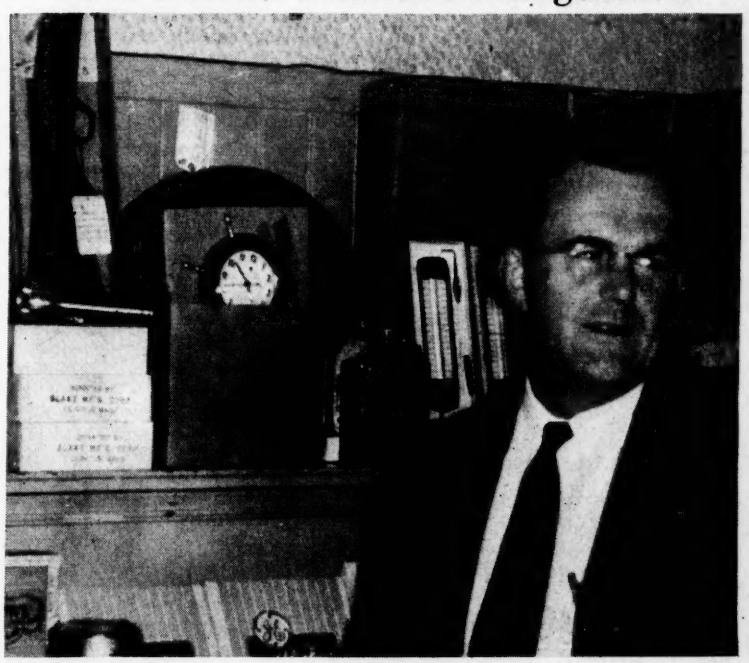
Printed copies of the papers presented at the A.S.M. Confidential Sessions on "Refractory-Type Materials for High-Temperature Applications" held in Cleveland Nov. 24-25, 1952, are now available for distribution to those who attended and wish to obtain copies for their private use. They should write for A.E.C. Technical Paper #NP 4527 to either of the following addresses: Armed Services Technical Information Agency, Document Service Center, Knott Bldg., Dayton 2, Ohio; or Technical Information Service, Oak Ridge, Tenn.

Ipsen Opens New Branch

Due to greatly increased sales on the East Coast, Ipsen Industries, Inc., Rockford, Ill., manufacturers of automatic heat treating equipment, is announcing the opening of a new sales and service division in Plainfield, N. J.

The decision to establish a New Jersey sales and service headquarters was based on the rapidly growing demand for Ipsen equipment in the East and on the desire to provide maximum maintenance facilities and service to Ipsen users and prospective customers.

At Worcester's Annual Smorgasbord



Worcester Chapter Observed Its Annual Smorgasbord at the First Meeting This Season. E. N. Anderson, football coach at Holy Cross College, gave a talk on "Football". Attendance prizes donated by Worcester County industries were distributed by Harold B. Bell (above), Worcester Stamped Metal Co., chairman, Membership Committee. (Photo by C. W. Russell)

Comments From the Young Engineers Who Attended Metal Show

From the comments arriving at National Headquarters from the various colleges and universities which sent their students and faculties to "Young Engineers Day" held on the last day of the National Metal Exposition, it would seem that the experience was both an enjoyable and profitable one for all. Following are excerpts from some of these letters.

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—On behalf of the engineering students and faculty, I wish to take this opportunity to thank you for the grand opportunity afforded us by the Society to visit the Metal Show. We were given a definite uplift by the reaction of the students to the exhibits and the renewing of many acquaintances . . . it has helped the staff to see in operation so many of the latest tools of the trade.—R. Clark Dawes, Professor of Chemical Engineering and Metallurgy, Grove City College, Grove City, Pa.

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—I want to thank you for the fine hospitality shown to us on our visit to the Metal Show. The students, faculty and the University are deeply indebted and very appreciative for the opportunity you provided us.—Lawrence H. Archer, Dean, College of Engineering, Ohio Northern University, Ada, Ohio.

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—We view this as another of the many important functions that A.S.M. performs for the promotion of engineering education in general, and metals engineering in particular. One wonders what can be done of a similar nature at the high-school level, perhaps on a more restricted basis. It is gratifying to note that this situation (importance of metals engineering) has improved considerably since five years ago when I first considered these problems as chairman of the A.S.M. Advisory Committee on Education. As usual, the entire Metal Show was superb.—A. R. Troiano, Head, Department of Metallurgical Engineering, Case Institute of Technology, Cleveland.

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—I wish to express the appreciation of our faculty and student body . . . I have had very favorable reactions from both on this event and we all appreciate the Society's efforts in making this event so worthwhile.—R. D. Landon, Dean, University of Akron, Akron, Ohio.

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—The Society is to be commended for presenting this opportunity to our engineering students and faculty; discussions in the halls and classrooms from many of the 550 who attended clearly indicate that they were surprised at the size of the Metal Show. Primarily, however, many returned to Pittsburgh with new ideas and a comprehension or new picture of the metal industry which could not have been obtained by such a large group except through the generosity of your Society. Your timing was excellent. We sincerely hope that the Society will continue extending invitations to colleges and universities located near host cities to the Metal Show. The A.S.M. made many new friends and only time will tell how the students' engineering careers may have been affected by this pleasant experience.—J. Alfred Berger, Professor and Head, Department of Metallurgical Engineering, University of Pittsburgh.

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—It is seldom that members of the faculty are guests of industry, so it is with deep sincerity that I thank you for the recent trip to your wonderful exposition. If more opportunities were presented like the one that was given to the engineering students and their faculty, I feel it would bring to everyone the tremendous task that is being done in the processing and fabrication of metals. I for one have a new concept of the field since my visit to Cleveland. My thanks to you for the fine trip and the opportunity to see your "Monument to Metal".—Alfred J. Philby, Associate Professor of Engineering Drawing, Ohio State University, Columbus, Ohio.

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—I would like to express our sincere appreciation for the opportunity to visit the Metal Show. We feel it was a day very well spent.—Mars G. Fontana, Professor and Chairman, Department of Metallurgy, Ohio State University, Columbus, Ohio.

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—We express appreciation for the privilege of attending the Metal Show. We were greatly impressed by both the exhibits and the accommodations provided for those attending. Without exception, all those who attended are looking forward to the pleasure of attending future expositions, either as students or representatives of industry.—Virgil L. Young, Chairman, Student Branch, American Welding Society, Ohio State University.

Discusses Metallurgy of Transistors

Ben H. Alexander, Engineering Manager of the Electronics Division, Sylvania Electric Products, Inc., Addressed the Tulsa Chapter in October on "Metallurgy of Transistors". Pictured at the speakers table are, from left: J. C. Holmberg, past chairman; George Sykora, program chairman; Dr. Alexander; and T. N. Duncan, chairman. Dr. Alexander discussed germanium and its alloys and manufacture. (Reported by T. N. Duncan)

Los Angeles Completes Successful Inspection Course

A series of lectures on "Inspection and Inspection Methods" has just been completed by the Los Angeles Chapter. The five lectures included were: "Analytical Tools", "Mechanical Testing", "Measuring and Using Hardenability", "Inspection Tools" and "Use of Tools in Failure Analysis". The last lecture was held on Nov. 19. Speakers were: Howard E. Pellett, Metal Control Laboratories; D. S. Clark, California Institute of Technology; Edgar Brooker, U. S. Spring & Bumper Co.; and Alex P. Maradudin, Standard Oil Co. of California.

Persons who completed the series of lectures were awarded Certificates of Achievement and complimentary dinner tickets to the regular Chapter meeting on Nov. 19.

National Research To Display

National Research Corp., Cambridge, Mass. will participate in the 120th meeting of the American Association for the Advancement of Science to be held in Boston from Dec. 27 through Dec. 30.

The products to be displayed by National Research will include the N.R.C. vacuum fusion gas analysis apparatus, diffusion pumps, Model 511 "Alphatron" vacuum gage, and Model-710 thermocouple vacuum gage and control.

Compliments

To GEORGE A. ROBERTS on his election as vice-president in charge of technology at Vanadium-Alloys Steel Co. Dr. Roberts, current vice-president of A.S.M., is a past-chairman of the Pittsburgh Chapter and served for many years on A.S.M.'s Publication Committee. He had been chief metallurgist at Vanadium since 1945.

♦ ♦ ♦

To ALEXANDER R. TROIANO who has been named head of the department of metallurgy at Case Institute of Technology. He replaces Professor KENNETH H. DONALDSON, former head, who died in September.

♦ ♦ ♦

To Mrs. GERTRUDE M. AVERBACH, wife of M.I.T. Professor B. L. Averbach, who just passed the Bar examination after completing studies at Boston College Law School. Prof. and Mrs. Averbach, who formed a mutual aid society three years ago so she could attend law school, are the parents of a 15-month old son, Paul.

♦ ♦ ♦

To J. L. HOLMQUIST, director of research, Spang-Chalfant Division, National Supply Co., on being given first-place award for his paper "Investigation of the Piercing Process by Means of Model Wax Billets", by the Association of Iron and Steel Engineers.

♦ ♦ ♦

To WALLACE E. CARROLL, president, American Gage & Machine Co., W. E. MAHIN, technical director, Research Center, Vanadium Corp. of America, and DAN MARTIN, vice-president in charge of engineering at Hughes Tool Co., on being elected as industrial leaders of the American Society of Tool Engineers' Research Fund Committee.

♦ ♦ ♦

To ROGER C. WAUGH and OTTO P. EBERLIN, Cornell University, on winning the A. F. David Undergraduate Welding Award for their paper "Penetration Factors in Metallic Arc Welding". Second award went to WAYNE JACOBS and CHARLES MARSHALL, University of Wisconsin, for their paper "A Comparison of the Quality of Weldments Prepared by Different Welding Processes". The awards are made annually by the American Welding Society for the best papers on welding published in undergraduate magazines or newspapers. Rewards were $200 for first prize; $150 for second.

♦ ♦ ♦

To W. B. WALLIS, president of Pittsburgh Lectromelt Furnace Corp., on his election as president of the Foundry Equipment Manufacturers Association.

Gives Wire Talk at Worcester

At the October Meeting of the Worcester Chapter, Rodman R. Tatnall (Left), Wickwire-Spencer Division, Colorado Fuel & Iron Corp., Spoke on "Manufacturers' Wires". With the speaker is Harold J. Elmendorf, chief spring engineer, American Steel & Wire Division, U. S. Steel Corp., chairman. The Chapter visited the new wire mill of the U. S. Steel Corp. in Worcester in the afternoon before the meeting. (Photograph by C. Weston Russell)

Machinability and Tool Design Factors Stressed By Speaker at York

Speaker: Carl J. Oxford, Jr.
Research Engineer
National Twist Drill & Tool Co.

"Machinability and Tool Design" were discussed by Carl J. Oxford, Jr., National Twist Drill & Tool Co., at a recent meeting of the York Chapter. Mr. Oxford traced the evolution of twist drills from the crude efforts of the Egyptians to the present time, and illustrated the major types of twist drills in use today.

Of the many indices of machinability, one of the most convenient is the ratio of power expended versus metal removed (i.e., the specific power consumption at the tool point). However, the exact index to be used depends on the problem to be solved.

The numerous design factors and their relation to machinability were described by the speaker. Among the factors covered were effective rake angle, clearance angle, web thickness, type of point, point angle, flute shape and width and flute helix angle. The effects of these factors were correlated with various materials being cut, including plastics.

A comparison of the geometry of standard and deep-hole drills was made to show the role of design in efficient drilling operations. A description of the Target drill, a trepanning-type gun drill (manufactured under license by the National Twist Drill & Tool Co.), for deep, straight and accurate holes, was utilized to further illustrate the many practical applications of tool design. **—Reported by John Gulya, Hamilton Watch Co.**

Hartford Educational Directory Prepared

As a part of its educational activities this year, the Hartford Chapter has prepared a directory of courses in metallurgy available in the area. Schools listed are Hartford Regional Technical School, Hillyer College and the University of Connecticut, and courses offered include elementary ferrous and nonferrous metallurgy, advanced metallurgy, metallography, physical metallurgy and theory of alloy systems.

Although the fall sessions are now near completion, persons interested in attending second semester courses may obtain a copy of the directory by writing to: Thomas P. Hanford, secretary, Hartford Chapter, Stanley Works, New Britain, Conn.

Boston Gives Course on Ferrous Metallurgy

The Boston Chapter is conducting an educational lecture course on "Fundamentals of Ferrous Metallurgy". Walter A. Backofen, Metals Processing Laboratory, Massachusetts Institute of Technology, will conduct the series. Lectures are as follows:

Nov. 12—Structure and Properties of Crystals.

Nov. 19—Iron Carbon Diagram and Principles of Steel Treating.

Dec. 10—Mechanical and Thermal Treatment of Steel.

Dec. 17—Complex Steels and Their Treatments.

Steel Extrusion Process Announced At Los Angeles

Speaker: G. A. Moudry
Chief Metallurgist
Harvey Machine Co.

Before an audience of over 200 at the opening meeting of the Los Angeles Chapter, G. A. Moudry, chief metallurgist of the Harvey Machine Co., announced and described the work at his company on the hot extrusion of steel. The subject of his talk "Hot Extrusion of Alloy Steel Shapes" was the first presentation before a technical group of this new and potentially revolutionary method of shaping alloy steels.

Numerous shapes have been successfully extruded at Harvey from both alloy steel and titanium. However, the major portion of Mr. Moudry's talk was devoted to the work in steel.

The process, developed by Harvey as part of a joint program with the Lockheed Aircraft Corp., and sponsored by the Air Force, involved the use of aluminum extrusion presses adapted to the requirements of alloy steel. This, combined with the use of special dies and billet lubricants, differentiates the Harvey process from the much publicized Ugine-Sejournet process. A movie illustrating the extrusion of steel and titanium shapes was shown.

In the alloys investigated, Mr. Moudry reported that no apparent difference between heat treated properties of extruded and conventionally rolled material was noted. Shapes of simple configurations, T, H and I-sections, were produced in lengths up to 30 ft. Good surface and tolerances were obtained.

The convincing economic advantage of steel extrusion in many applications was illustrated. Extru-

G. A. Moudry

sions of SAE 8630 alloy steel were cut into 5 in. lengths, drilled and installed on Lockheed military Constellations without further machining. Finished price of the extruded part was approximately ¼ the cost of the same part previously machined from bar stock.

In closing, Mr. Moudry emphasized that the work in the hot extrusion of steel at Harvey was still in its infancy. The results obtained to date indicate that extrusion is a practical method for forming steel and can be expected to be of increasing importance to the user of steel products.—**Reported by Ward W. Minkler, Titanium Metals Corp. of America.**

Stresses Importance Of Stainless Steels In the Metal Industry

Speaker: H. P. Rassbach
Metallurgical Engineer
Electro Metallurgical Co.

The first meeting of the Canton-Massillon Chapter was attended by approximately 100 members and guests. The meeting was highlighted by a technical address presented by H. P. Rassbach, metallurgical engineer, associated with the technical development group of the Electro Metallurgical Co. The topic of his address was "Stainless Steel Melting".

Mr. Rassbach stressed the ever-increasing importance of stainless steels in the metals industry. The advent of the jet engine and gas turbine, which require large amounts of nickel, has not retarded the overall growth of the stainless industry and a big market is assured for the future. Production of all grades of stainless steels for the first six months of 1953 was reported to be 50,000 tons greater than that of any peak war year.

Mr. Rassbach gave an excellent presentation of the problems involved in the melting of the stainless grades and the progress that has been made towards the solution of some of these problems.

The conservation of chromium and manganese in stainless steel melting, in particular, is receiving considerable attention and is the subject of a number of intensive studies undertaken by the Electro Metallurgical Co. and others. The effects of temperature, slag basicity and silicon content of the bath are all important factors influencing the recovery of chromium and manganese from the oxidizing slag. The relatively new chromium-manganese-nickel-nitrogen stainless grades were briefly discussed and it was reported that complete constitutional diagrams of the Cr-Mn-Ni-N_2 systems are in the process of development. These diagrams should be helpful in supplying the needed information to determine the capabilities of manganese as a substitute for nickel in stainless grades.—**Reported by G. P. Michalos, Research Metallurgist, Timken Roller Bearing Co.**

New Haven Lectures Stress Alloying Fundamentals

"Fundamentals of Alloying", a series of six lectures designed for the modern metallurgist and engineer, has been concluded by the New Haven Chapter. Although fundamentals were stressed, the speakers covered modern concepts and applications as well, and the series was very well received by members and their interested guests.

Lectures and speakers included:

Introduction to the Structure of Metals and Alloys, by F. N. Rhines, Carnegie Instiute of Technology.

Alloying to Obtain Specific Properties in Aluminum and Magnesium, by G. F. Sager, Aluminum Research Laboratories.

Alloying for Corrosion Resistance, by Herbert H. Uhlig, Massachusetts Institute of Technology.

Alloying for Toolsteel Applications, by S. G. Fletcher, Latrobe Steel Co.

Alloying of Copper to Produce Specific Properties, by H. L. Burghoff, Chase Brass & Copper Co.

Alloying to Produce High-Temperature Properties, by Russell Franks, Union Carbide & Carbon Corp.

Yale & Towne Add Division

A new division of the Yale & Towne Manufacturing Co., the Powdered Metal Products Division, has recently been established, thus consolidating the company's expanding operations in the growing field of powder metallurgy. The new division unifies under one management the recently acquired Powdered Metal Products Corp. of America, and the American Sintered Alloys Division, both acquired by Yale & Towne in 1952.

Open Tube Mill

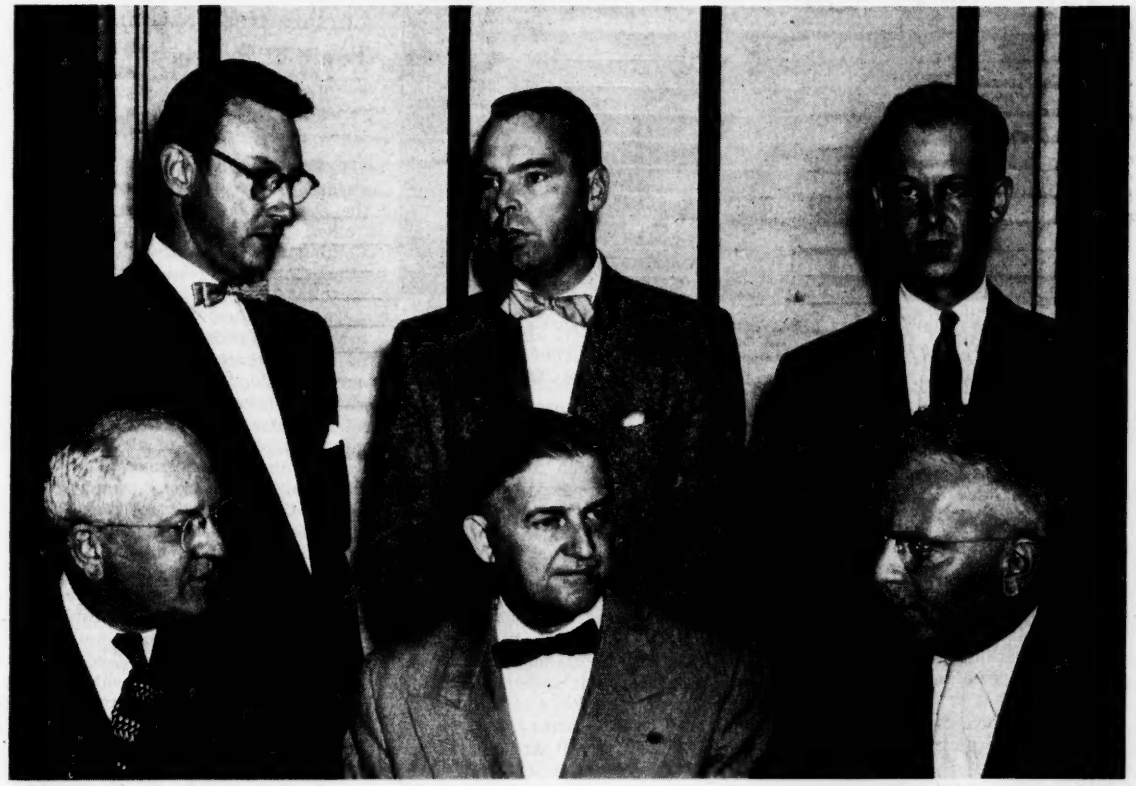
The Colorado Fuel and Iron Corp. has recently opened a new $30-million seamless tube mill at Pueblo, Colo. The mill, the first west of the Mississippi, will be an important supplier of seamless steel tubing and casing to the oil and gas industries of the western United States and Canada. Seamless pipe produced here will be readily accessible to the great oil and gas fields of Oklahoma, Kansas, Wyoming, West Texas, the Pacific coast and western Canada.

Forms Zirconium Company

Formation of the Zirconium Corp. of America, Solon, Ohio, has been announced by George R. Sylvester, president. The new corporation plans to manufacture various zirconium compounds but will concentrate on production of zirconium oxide.

Present plans call for full-scale production at the new plant during the early part of 1954.

Florida Hears Speakers and Panel on Welding



Ted B. Jefferson, Welding Engineer *Editor, Spoke on "What Welding Means to America" in Jacksonville Recently. Shown are, rear, from left: J. B. West, Aluminum Co. of America, Lawrence Kelly, Linde Air Products Co., and Charles Danzer, Sciaky Brothers, Inc., who conducted a welding panel during the meeting; and front, from left: Fletcher Morgan, Florida Legislature; Harry Huester, chairman; and Mr. Jefferson*

Speaker: Ted B. Jefferson
Editor
Welding Engineer and Welding Encyclopedia

Florida is known throughout the United States as one of the most progressive states in the field of welding, T. E. Jefferson, editor, McGraw Hill Publishing Co., stated during his address "What Welding Means to America" at the Jacksonville Chapter's October meeting. Mr. Jefferson is editor of the *Welding Engineer* and *Welding Encyclopedia,* two of the country's leading technical publications in the field of welding.

Florida's welding progress in building and bridge constructions now has an enviable place in engineering development. The replacement of riveted construction by welding has been rapid and results in considerable savings in materials, time and money, with a noticeable increase in over-all beauty of design because of the light-weight construction welding makes possible.

Following the address by Mr. Jefferson, an unusual "Panel of Experts" answered welding problems submitted by those in attendance. This panel consisted of Charles Danzer, Washington, D. C. representative of Sciaky Brothers, J. B. West, district development engineer, Atlanta District, Aluminum Co. of America, and Lawrence Kelly, manager of engineering services, Atlanta District, Linde Air Products Corp.—**Reported by H. J. Huester, Overhaul and Repair Dept., U. S. Naval Air Station.**

Chrysler Expands

Production facilties at Chrysler Corp.'s Los Angeles plant will be expanded in the near future with the installation of two new assembly lines and new body finishing operations. The new assembly lines will replace the single line that has previously produced Plymouth, Dodge, DeSoto and Chrysler passenger cars at the Los Angeles plant.

The body finishing installation will include facilities for metal finishing, painting and trimming of passenger car bodies. Up to the present time these operations have been carried on in Detroit plants.

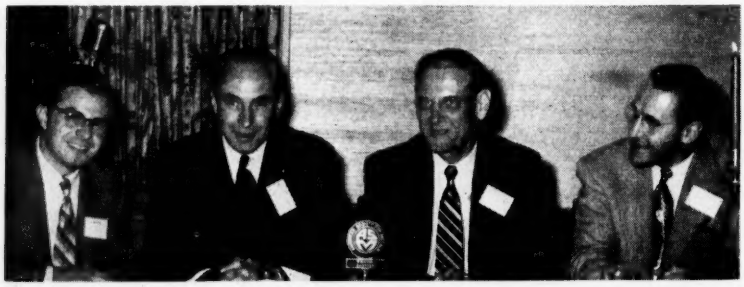
The new assembly lines and body plant are expected to be in operation in the first half of 1954. They will provide a substantial increase in productive capacity and employment at the plant.

Chicago Educational Series Turns Away Overflow Audience

The Chicago Chapter, which just completed an educational lecture series on "Heat Treatment of Steels", reports that there was such a huge response to their initial announcement that an emergency notice had to be sent out urging people not to come. Despite these notices, Chapter officers were put in the embarrassing position of having to refuse registration to about 50 persons on the night of the first lecture. Paul Zimmerman, who operated at the desk, exerted such tact and diplomacy that he would have put any airlines reservation clerk to shame, and the Chapter survived its first lecture without any evident hard feelings.

Muir L. Frey, Allis-Chalmers Manufacturing Co., lecturer for this too-popular course, presented four talks on the following subjects: Principles of Hardening; Hardenability and Changes During Cooling; Tempering, Normalizing and Annealing; and Case Hardening and Miscellaneous Operations. The text, Principles of Heat Treatment, by M. A. Grossmann, was used throughout the course.

Talks About Copper Alloys in Chicago



Chicago Chapter Heard L. E. Gibbs, Revere Copper & Brass Inc., Speak on "Copper Alloys and Their Uses" at Their Annual "Nonferrous Night" in October. Shown above are, from left: Otto Zmeskal, chairman; Mr. Gibbs; J. F. Calef, Automatic Electric Co.; and J. A. Kubik, Stewart-Warner Corp.

Speaker: L. E. Gibbs
Manager, Technical Service
Revere Copper & Brass, Inc.

Chicago Chapters' annual "Nonferrous Night" in October was highlighted by a talk by L. E. Gibbs, manager, technical service, Revere Copper and Brass, Inc. Mr. Gibbs brought his broad experience and daily association with user problems to bear in discussing "Copper Alloys and Their Uses".

The discussion first covered a review of the important copper alloys and was followed by a number of colored slides showing how these alloys could be used.

Copper as a tonnage item is sold as "tough pitch electrolytic copper" containing about .03% oxygen, used in manufacturing automobile radiators, car heaters, electrical bus bar, commutators, motor-generators, air conditioning and heating apparatus, etc. It may be modified by the addition of phosphorus, silver and other elements to improve its performance.

The first alloy group discussed was brasses. Adding zinc changes color from copper to a gold and then to yellow of brass. Tensile strength and ductility are increased to an optimum at 30% zinc. Amounts more than 34% form a second phase which reduces ductility though further increasing strength.

Plain brasses may be further modified by the addition of tin, the purpose of which is to increase strength, and improve fatigue and corrosion resistance.

Adding lead greatly improves machinability, although it reduces ductility. A balance may be struck between cold forming requirements and machinability, however, when both are needed to produce a part.

The high strength alloys, silicon bronze and aluminum bronze, are used for tanks, chemical vessels and similar applications. The former may be modified for use in cold heading bolts, nuts, screws, etc.

Phosphor bronzes are made in several grades containing between 5 and 10% tin which are notable for corrosion resistance and fatigue resistance. Largest applications are in the form of bellows, diaphragms, springs and similar uses where fatigue is important.

A number of the illustrations pointed up the use of extruded shapes to produce parts difficult to make by other methods; use of various tempers and compositions for machining and forming; various applications of plain brasses to cold formed parts showing effects of grain size; and others describing general characteristics of copper alloys—**Reported by J. A. Erickson, Electro Motive Division, General Motors Corp.**

Gas Carburization and Carbon Restoration Topic at Peoria

Speaker: Orville E. Cullen
Chief Metallurgist
Surface Combustion Corp.

Approximately 140 members and guests at the October meeting of the Peoria Chapter heard Orville E. Cullen, chief metallurgist, Surface Combustion Corp., present a talk on "Gas Carburizing and Carbon Restoration".

The talk was introduced with a brief explanation of the mechanism of gas carburizing. Some of the early problems concerning the process due to some misleading premises of early research and the progress in correcting them were also discussed.

According to the speaker, the main advantage of gas carburizing is the ability to closely control the process. He listed various factors involved in control, such as the means of measuring carburizing potential, their relative accuracy, and the effects of the gases involved. Examples of using controlled carburizing potentials to achieve desired end results were presented. They showed the possibility of closely controlling carbon concentration and distribution throughout the case as well as throughout individual parts if so desired.—**Reported by W. O. Kaarlela, Metallurgical Dept., Caterpillar Tractor Co.**

Young Scientists Receive Awards

Presentation of a First-Place Award in the Science Achievement Awards Program Was Made at the Edmond Meany Junior High School, Seattle, Wash., to Sidney Handlin (Left) and John Kulander (Center) by Monte Parker, Chairman of Puget Sound Chapter. The award was won jointly by the boys for a paper entitled "The Effect of Penicillin on Growing Plants and Seeds"

Discusses Refractory Metals for High-Temperature Service

Speaker: Roger A. Long
Ferrotherm Co.

Roger A. Long, manager and chief engineer of the aircraft components division of the Ferrotherm Co., addressed the Mahoning Valley Chapter on "Refractory Metals and Alloys for High-Temperature Service" at their first meeting this season.

According to the speaker, the major use of these materials is presently in the development of jet and ram-jet engines.

The temperature range involved during operation of jet engines ranges from 1500 to 2000° F. at the present time. Contemplated temperatures are in the range from 1800 to 2400° F. Some of the properties and definitions associated with these materials are:

1. Rupture strength—load at a given temperature for a given length of time.
2. Oxidation resistance.
3. Brittleness—usually pertaining to a certain temperature range.
4. Thermal shock resistance — shock resistance of the material being quenched in fuel or air down to room temperature.

The two main categories of refractory metals are pure metals or alloys and refractory compounds. The first group includes such high-melting point metals as chromium, molybdenum, titanium and tungsten. The main drawback in the use of these pure metals is their poor oxidation resistance at elevated temperatures. Another limitation seems to be the brittleness associated with certain temperature ranges. For example, this adverse effect would become apparent during the warming up and cooling of the engine.

The second classification, the metal compounds, are simply an alloy combination of a refractory metal with a semimetallic or nonmetallic element. Such a combination would be, for example, tungsten carbide or molybdenum silicide. The main compounds are the carbides, borides, hydrides, nitrides and silicides.

The carbides have been the subject of the most research and development, due to the cutting tool development in the 20's. Such factors as poor thermal shock, brittleness and poor oxidation resistance, either separately or in combination, place some restrictions on their use. The halides are not stable at elevated temperatures. The borides offer a bright outlook. The Navy has backed boride development work and has placed security regulations on its information. This group has high melting points and can be bonded with compounds offering good oxidation resistance at elevated temperatures. The nitrides offer possibilities, the best feature being the low specific gravity of members of this group. Little is known about these compounds.

According to Mr. Long, however, the disilicides offer the biggest future because of their good oxidation resistance at elevated temperatures and high strengths. This is apparently due to the fact that silicon forms a series of oxides and dioxides with the refractory metals which resist further oxidation. Also the crystal structure aspects give these materials an inherent ability to resist further oxidation, and this crystal structure is also a contributing factor to the strength of the material.—**Reported by John D. Anderson, Metallugical Assistant, Youngstown Sheet & Tube Co.**

Columbia Basin Holds Its First Ladies Night Meeting

The first Ladies Night meeting held by the Columbia Basin Chapter was a great success. Some 78 members and their guests heard Randall E. Brown give an interesting discussion on "Cinnabar", samples of which were exhibited to illustrate his talk. —**Reported by Louis Turner, Chapter Secretary.**

Speaks on Specification of Steels

L. E. Simon (Right), Chief Metallurgist, Electro-Motive Division, General Motors Corp., Gave a Talk on "Selection and Specification of Steels" at the October Meeting of the Milwaukee Chapter. George J. Barker (left), University of Wisconsin, was technical chairman. (Photo by N. Thorkildsen)

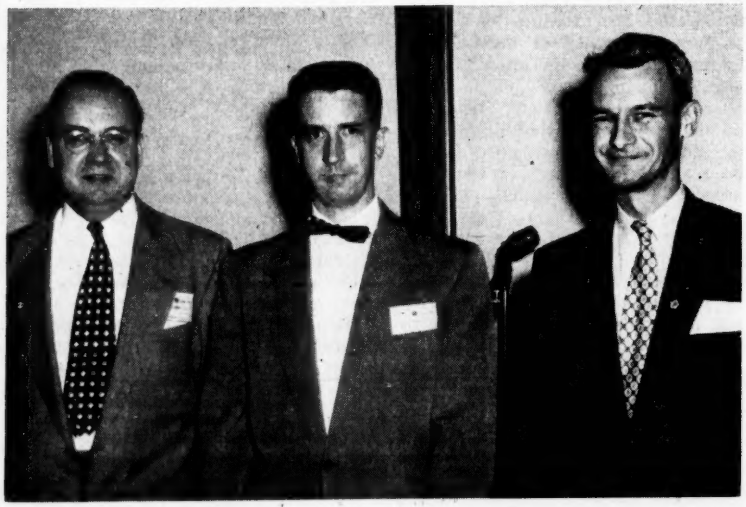
Speaker: L. E. Simon
Chief Metallurgist
Electro-Motive Div., General Motors Corp.

George J. Barker of the University of Wisconsin introduced L. E. Simon, chief metallurgist, Electro-Motive Division, General Motors Corp., who presented a technical discourse on the "Selection and Specification of Steels" at the October meeting of the Milwaukee Chapter.

Mr. Simon discussed design, heat treating and hardenability as factors in selecting steel for various jobs. He also discussed the value of the Jominy end quench in determining the hardenability of various steels, and how compressive prestress was used to advantage in highly stressed parts of a diesel locomotive. He discussed machinability, grindability and substitute steels as factors in selecting steel from an economic standpoint.

Ray Blom of the Ladish Co. gave a coffee talk on a recent European trip which he and his family had taken. The talk was illustrated with colored 3-D slides taken in England, France, Holland, Switzerland and Italy—**Reported by D. E. Wallschlaeger, Metallurgist, A. O. Smith Corp.**

Alcoa Speaker Explains Extrusion Plant



A. L. Hurst, Chief Metallurgist of Alcoa's Lafayette Works, Spoke on "Fabrication of Aluminum Extrusions and Tubes" at Purdue Chapter Recently. Shown above, from left, are: Mr. Hurst; Thomas J. Hugel, chapter chairman; and Glenn A. Fritzlen, vice-chairman. The Chapter took a plant tour through the Lafayette Works in the afternoon before the meeting

Speaker: A. L. Hurst

Chief Metallurgist-Lafayette Works
Aluminum Co. of America

The Purdue Chapter's Sustaining Members Night consisted of a tour of the Aluminum Co. of America's plant at Lafayette, Ind.

Prior to the tour, A. L. Hurst, chief metallurgist of Alcoa's Lafayette Works, gave a short talk on the "History of Aluminum and the Fabrication of Aluminum Extrusions and Tube at Alcoa." Mr. Hurst is a past chairman of the Purdue Chapter.

Alcoa's Lafayette Works has three operating divisions—remelt, extrusion and tube. It is one of four of the company's extrusion-tube plants and is the largest aluminum extrusion-tube plant in the world, with over 40 acres under roof.

In the remelt division aluminum pig, alloy metals, mill and purchased scrap are remelted and alloyed to produce a variety of commercial alloys. The metal is cast by the Alcoa direct chill method or the tilt mold method.

The extrusion division produces extruded shapes and tube and drawn tubes. Something just under 70,000 different aluminum extruded shapes have been prouced to date by Alcoa. The presses range from 2500 to 5200 ton capacity and the new 14,000 ton Air Force press, the largest extrusion press in the U. S., will be put into operation in the near future. Extrusion products are supplied in the as-extruded, annealed or heat treated tempers.

The tube division uses the extruded tube stock as starting material and demonstrates the reason why extrusion and tube mills are located in the same plant. The advantages of drawn tube over extruded tube include closer dimensional tolerances and greater variety of mechanical property combinations. The tube division uses the drawbench, tube reducer and drawblock methods of reduction. Finishing operations are very similar to those for extrusion. **—Reported by L. J. Ewalt, Metallurgist, Ross Gear & Tool Co.**

Cites Benefits of Good Quality Control Program at Calumet

Speaker: Harry C. Hausman

Superintendent of Inspection
Budd Co.

At the October Meeting the Calumet Chapter heard Harry C. Hausman, superintendent of inspection, Budd Co. talk on "The Place of Quality Control in the Sheet Metal Industry".

Mr. Hausman pointed out the following objectives of quality control: Quality improvement through the control of processes while they are producing; better management by providing sound accurate data as a basis for making decisions; and reduced costs through less scrap and rework, and less waste of machines and manpower.

Mr. Hausman stressed the importance of achieving full coöperation of all branches of management and labor to the successful application of a quality control program. He pointed out that quality control is a management tool and must be inaugurated by and have the full support of top management. They must recognize the necessity of educating *all* personnel—the executive branch, the supervisory staff, and union representatives. They must provide the tools, be ready to back up the decisions of the quality control group, and hire good men as needs develop and the program expands. Particularly, they must maintain an adequate reference library of books and journals.

The inclusion of the union representative in this plan, Mr. Hausman says, is because it has been his experience that when union leaders are familiar with quality control they like it and give their wholehearted cooperation. The reason is obvious. Trouble results from one of four factors—men, machines, methods or materials. Without quality control trouble is apt to be blamed on men. With quality control it is possible to determine scientifically which is at fault. American labor is willing to take responsibility for it's own mistakes but hates to be blamed when the trouble is with machines that should have been replaced, materials that are of poor quality or methods that are out-dated.

Mr. Hausman briefly described methods of sampling, statistical control methods and maintaining quality records, and pointed out that such a program provides a means of ferreting out trends and will impress manufacturing personnel with the truism: "Take care of quality and quantity will take care of itself".

He also stated that the human factor plays a very important part in quality control, and the more time that is given to the development of both the human and personal factor, the more success you are going to have.—**Reported by K. R. Hine, Chief Metallographer, National Tube Div., U. S. Steel Corp.**

New Machinery Company

The pioneer company in the modern seamless tube industry, Mannesmann Works, Germany, has combined with one of the world's leading seamless tube mill machine manufacturers, Maschinenfabrik Meer A. G., to form a new company in this country, Mannesmann-Meer Engineering and Construction Co., in Easton, Pa. This new company will offer a complete line of seamless tube mill machinery as well as hydraulic equipment and other special mill machinery for the steel, copper, brass, aluminum and other branches of the metalworking industry. The Mannesmann-Meer Mechanical Extrusion press for the production of seamless tubing in both steel and nonferrous alloys will be one of the feature items in the line.

Along with this line of machinery, the company will also offer complete engineering service for the planning, installation and operation of seamless mill machinery.

Repair of Structures By Welding Subject of Cedar Rapids Speech

Speaker: Ned L. Ashton
Professor of Civil Engineering
State University of Iowa

Ned L. Ashton, consulting engineer and professor at the State University of Iowa, gave a talk on "Design of Welded Structures and the Repair of Structures by Welding" before a meeting of the Cedar Rapids Chapter

Prof. Ashton showed a number of excellent slides illustrating how arc welding has been used to advantage to repair such structures as the MacArthur Bridge at Burlington, Iowa. Prof. Ashton, who was the consulting engineer for this project, was able to give a step-by-step account of how an unsafe bridge was repaired by arc welding, at a reasonable cost, to carry the heaviest kind of load found on our highways. The surprising part of this extensive repair job was that it was done without interrupting traffic over the bridge.

Prof. Ashton stated that there are many unsafe bridges in use throughout the country that could be economically repaired by arc welding. He stated that many of the bridges

Ned L. Ashton

were constructed about the same time, they were not designed for our modern heavy traffic, and funds could not possibly be made available to replace them for a number of years. Yet these bridges, which are vitally needed, could be repaired at a fraction of the cost of a new bridge and continue to give service for a number of years.

Some of the repairs which can be made by arc welding are: increasing the depth of girders, adding tee-flanges, adding stiffeners and making butt joints, some of which would be practically impossible by other methods of fabrication.

The fundamentals that must be taken into consideration in the design of welded rigid-frame buildings were discussed and illustrated. The current "Studies in Structural Arc Weld ng", published by Lincoln Electric Co., were used to supplement the speaker's discussion.—**Reported by Edward M. Mielnik, Assistant Professor of Mechanical Engineering. State University of Iowa.**

IMPORTANT MEETINGS
for January

Jan. 18-22 — American Institute of Electrical Engineers. Winter General Meeting. Statler Hotel, New York. (H. H. Henline, Secretary, A.I.E.E., 33 W. 39th St., New York 18, N. Y.)

Obituaries

Chester B. Hamilton

Chester B. Hamilton of Hamilton Gear and Machine Co. Ltd., Toronto, died in October. He was president and general manager of the Hamilton Gear Co., an active member of many technical societies, and, during World War II he developed a substitute bronze for worm gears to conserve scarce tin and offered all industry the free rights to utilize the analysis.

Gordon Sproule

Gordon St. George Sproule, associate professor of metallurgical engineering, McGill University, Montreal, died accidentally at sea in October on his return voyage from the British Isles where he had been on vacation. Prof. Sproule, who was educated at McGill, and who spent most of his active professional life as an instructor at the University, was a recognized authority on iron and steel as well as metallography. He was awarded the Plummer Medal of the Engineering Institute of Canada in 1924 for his contributions to his profesison. He was a charter member of the Montreal Chapter A.S.M. and chairman for 1929-30.

J. Paul Bindyke

J. Paul Bindyke, metallurgical engineer for Heppenstall Co. for nearly 35 years, died in October. He was 57. Mr. Bindyke joined Heppenstall after graduating from Carnegie Institute of Technology.

Rochester Hears Replogle on Toolsteels

Members of the Rochester Chapter Heard H. Replogle, Universal-Cyclops Steel Corp., Discuss "Recent Developments in Toolsteels" at Their Sustaining Members Night Meeting Recently. Shown are, from left: D. VandeVate, vice-president, Gleason Works; Mr. Replogle; Robert Guinan, chapter chairman; and Harold S. Norris, Ontario Metals Supply Inc.

Speaker: Hugh E. Replogle
Universal-Cyclops Steel Corp.

Hugh E. Replogle, manager of toolsteel sales development for Universal-Cyclops Steel Corp., related his experiences in "Recent Developments in Toolsteels" before a meeting of the Rochester Chapter.

In describing steels in general use today, Mr. Replogle pointed out some of the unusual changes in applications for certain steels. Moly-type high speed steels are now being used for bearings in jet engines. The former tungsten chisel steel is being used with great success in dies for the cold extrusion of steel. The tough silicon manganese steels have performed well as knock-out pins on cold header dies. The old-time, all-purpose carbon toolsteels are presently being used for cold heading and silverware blanking. For the cold heading of stainless and heat resisting alloys, carbide inserts in toolsteel holders have worked well.

Valuable data were distributed on the recommended allowances for machining for hot rolled, cold drawn and hammered bar stock.

The sustaining members of the Chapter were honored at this meeting, and Robert Guinan, chairman, expressed the Chapter's appreciation to them for their loyal support of all A. S. M. activities.—**Reported by Robert W. Bishop, Metallurgist, Eastman Kodak Co.**

CHAPTER MEETING CALENDAR

CHAPTER	DATE	PLACE	SPEAKER	SUBJECT
Akron	Jan. 20		A. Nasrallah	Paints as a Corrosion Preventative
Baltimore	Jan. 18	Engineers' Club	Walter Crafts	Alloying Effects of Deoxidizers
Boston	Jan. 8	Hotel Shelton	H. J. French	Engineering Alloy Steels for Use With and Without Quenching and Tempering
Buffalo	Jan. 14	Hotel Sheraton	Peter Payson	Hardenability of Steel
Calumet	Jan. 12	Phil Smidt's	G. A. Roberts	Toolsteels
Carolinas	Jan. 21	Winston-Salem	George Shad	Toolsteels
Cedar Rapids	Jan. 12	Roosevelt Hotel	J. Fetters	Aircomatic Welding Process
Chicago	Jan. 11	Museum of Science and Industry	V. E. Lysaght	Hardness (Young Fellows' Night)
Cincinnati	Jan. 14	Eng. Soc. Hqd.	R. A. Flinn	Relation of Metal Structure to Wear Resistance
Cleveland	Jan. 11	Hollenden Hotel	D. S. Billingsley	Atomic Energy in Metallurgy
Dayton	Jan. 13	Engineers' Club	J. B. Austin	Magnification in Time
Detroit	Jan. 11	Rackham Memorial Bldg.	William Grube	Metallurgical Applications of the Electron Microscope
Georgia	Jan. 5	Georgia Tech	T. C. DuMond	Engineering Materials
Golden Gate	Jan. 11	El Curtola	Robert Grant	Practical Instrumentation
Hartford	Jan. 12	The Hedges	F. E. Dreves	Effects of Cold Drawing, Microstructure and Thermal Treatments on Carbon and Alloy Steels
Indianapolis	Jan. 18	McClarney's	E. A. March	Rolling and Forging of High Alloy Steels
Jacksonville	Jan. 11	Seminole Hotel		Nondestructive Testing
Kansas City	Jan. 20	Fred Harvey's	A. T. Ridinger	Commercial Heat Treating Practice
Los Angeles	Jan. 21	Rodger Young Auditorium		Old Timers' Night
Louisville	Jan. 5	5 and 1 Club	Richard Herold	Shell Molding
Mahoning Valley	Jan. 12	V.F.W.	W. O. Philbrook	Engineering and Science in Steelmaking
Milwaukee	Jan. 12	City Club	J. B. Austin	Magnification in Time
Minnesota	Jan. 21	Covered Wagon	R. H. Aborn	Metallurgy of Ferrous Welding
Montreal	Jan. 4	Queen's Hotel	H. J. Roast	Opportunities for Youth in Metallurgy
Muncie	Jan. 12	Sycamore Inn	L. B. Rousseau	Characteristics of Salt Bath Furnaces
New Haven	Jan. 21	Hotel Barnum, Bridgeport	A. A. Burr	Modern Spectrography and the Use of Direct Reading Instruments
New Jersey	Jan. 18	Essex House	B. L. Averbach	Dimensional Behavior of Heat Treated Steels
New York	Jan. 11	Schwartz's Restaurant	J. T. Norton	Introduction to Cermets
Notre Dame	Jan. 13	Eng. Bldg.	H. K. Ihrig	Corrosion of Steels at High Temperatures
Oak Ridge	Jan. 20	K. of C. Hall	E. N. Skinner	High-Temperature Corrosion
Ontario	Jan. 8	Toronto	Ray Cochran	Where and Why to Use Bronze
Ottawa Valley	Jan. 5	P.M.R.L.	J. L. Kimberley	Continuous Casting
Philadelphia	Jan. 29	Engineers' Club	E. Chapman	Metallurgical Stress Analysis
Philadelphia-Jr. Section	Jan. 8	Engineers' Club	Panel	General Metallurgy
Pittsburgh	Jan. 14	Ft. Pitt Hotel	J. B. Austin	Action in the Openhearth
Purdue	Jan. 19	Purdue Mem. Union	H. B. Osborn	Induction Heating
Rhode Island	Jan. 9	Verdandi Club		January Thaw
Rochester	Jan. 11	C. of C.	E. H. Dix, Jr.	Aluminum in the Light Metal Age
Rockford	Jan. 27	Faust Hotel	H. B. Knowlton	
St. Louis	Jan. 15	DeSoto Hotel	J. Y. Reidel	Improving Production From Tools and Dies
Saginaw Valley	Jan. 19	Frankenmuth	F. L. LaQue	Metallurgical Structures and Corrosion
Springfield	Jan. 18	Blake's Restaurant	F. L. LaQue	Corrosion
Syracuse	Jan. 5	Onandaga Hotel		Home Industry Night
Texas	Jan. 5	Ben Milam Hotel	Peter Payson	Hardenability of Steel
Toledo	Jan. 8	Maumee River Yacht Club	McMaster	Nondestructive Testing
Tri-City	Jan. 5	Rock Island Arsenal	E. S. Rowland	Practical Applications of Physical Metallurgy
Warren	Jan. 14	El Rio Restaurant		Making and Shaping of High-Temperature Alloys
Washington	Jan. 11	Naylor's Restaurant	A. Nehrenberg	Super-High-Strength Structural Steels
West Michigan	Jan. 18	Lock's Restaurant	K. Kramer	Editorial Night
Western Ontario	Jan. 8	Windsor		Stump the Experts Night
Wichita	Jan. 19	K. of C. Hall	D. O. Sprowls	Corrosion Aspects of Aluminum
Worcester	Jan. 13	Hickory House	G. Motherwell	What's New in North Grafton
York	Jan. 13	York, Pa.	G. E. Brumbach	Trouble Shooting on Toolsteels

Gives History of Development of Silicon Iron Sheet

Speaker: William Jones
Armco Steel Corp.

At a joint meeting of the St. Louis Chapter A.S.M. and the American Society for Testing Materials, William Jones, administrative assistant to the sales manager, Armco Steel Corp., spoke on "Magnetic Materials", giving a comprehensive view of the commercial development of silicon iron sheet.

It was a surprise to most of the audience to know that 750,000 tons of silicon iron sheet is made every year in America. The alloy was first produced by Sir Robert Hadfield in the middle 80's of the last century as a byproduct of the work which resulted in the wear resistant high-manganese castings. Fortunately, its magnetism was investiagted and it became a basic material for alternating current transformers and induction motors.

Recent great improvements in its magnetic characteristics has followed the unplanned discovery, by Norman Grossmann (A.S.M.) in 1933, that the crystalline structure could be oriented in a favorable direction by a controlled program of repeated cold rollings and annealings. Armco Steel Corp. spent much time and effort in the 1930's to discover commercial methods of refining and working this hard, somewhat brittle alloy, and a final cleaning and developing a heat treating process which provides an adequately insulating surface layer of microscopic thickness.

Mr. Jones proceeded to classify the various present-day types of silicon iron alloys and stated their commercial limitations as to analysis, size, temper and use. He spoke of "flatness" as an important consideration to the user, but a property which is not easy to measure nor to provide.

The commercial experience gained by Armco enabled its research department to install a small Sendzimer mill in wartime which produced silicon iron of oriented grain in sheet no thicker than two mils (0.002 in. about the thickness of the paper on which this issue of *Metals Review* is printed). Such material was necessary for ultra-short-wave radar. More recently, ⅛ in. wide strip of ⅛ mil thickness (0.00012 in.) has been made for the electronic industry.—**Reported by F. Delaplane, Cupples Products Corp.**

Cleveland Chapter A.S.M. Plans Special Meeting on Radiation of Materials

Cleveland Chapter A.S.M. will present a meeting on "The Effect of Radiation of Materials" on Monday, Jan. 11, 1954. D. S. Billington, director of solid state division, Oak Ridge National Laboratory, will deliver the address. Dr. Billington's lecture will involve nonclassified recently released data on radiation and materials as well as the metal physics associated with the phenomena. The meeting is open to all interested persons, whether members of the Society or not.

Special invitations to this meeting are being distributed to the following educational institutions and companies: National Advisory Committee for Aeronautics, Lewis Laboratory, Cleveland; Cleveland Electric Illuminating Co.; Ohio Toledo and Detroit Edison; Fenn College; Case Institute of Technology, dean of engineering and physics, electrical, mechanical and metallurgical engineering departments; John Carroll University, physics department; Kent State University, engineering department; Youngstown College, engineering and physics departments; University of Toledo, engineering and physics departments; Thompson Products, Inc.; Cleveland Technical Society Council; Cleveland Engineering Society and associated societies; Mahoning Valley, Canton-Massillon, Toledo and Columbus Chapters A.S.M.

Kropp Plans New Shop

The Kropp Forge Co., Chicago, has announced the beginning of a $5,500,000 improvement and expansion program which will enable the firm to produce larger and more complex forgings for Army aircraft parts. The program includes the construction of a new hammer shop at the Chicago plant to house the additional equipment necessary for forging important aircraft components of titanium, stainless steel and heat resisting alloys.

Industrial BRIEFS

A new line of presses with capacities ranging upward from 160 tons will supplement the Cleveland Crane & Engineering Co.'s heavy press field.

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Electronics research and production facilities of Kaiser Motors Corp. and Willys Motors, Inc., are being consolidated in a new division of Willys. The new arrangement is expected to make maximum use of the Tinkertoy development, the automatic electronics assembly line that engineering worked out for the Bureau of Standards and the Navy.

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Republic Steel Corp. will install a cold rolling mill and auxiliary equipment to increase rolling capacity of stainless steel by 18,000 tons of finished products a month at its Massillon, Ohio, plant.

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The Beryllium Corp., Reading, Pa., is making available for the first time on a commercial scale metallic beryllium in the form of extremely pure and highly ductile flakes.

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A committee on Vacuum Techniques, Inc., is being set up to boost high-vacuum research and technology. It's organized as a nonprofit corporation for spreading knowledge, promoting exchange of ideas and encouraging research on vacuum processes and equipment.

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The University of Tennessee, only 20 minutes from Oak Ridge National Laboratory, is the site of a new $6-million isotopic research center and hospital. It will be erected jointly by the state of Tennessee, the city of Knoxville and Knox County.

Science Achievement Awards Program for 1953-54

Now is a good time to request copies of the Rules Book and Entry Forms for the 1954 Science Achievement Awards Contest.

This awards program has several features that make it especially attractive. Many science teachers have been confronted with the situation in which groups of their students have completed worthwhile projects but no opportunity was available to give the students the recognition they deserved. The Foundation is gratified to have the American Society for Metals make such an opportunity available, especially so since it extends from the seventh through the twelfth grades.

This program also recognizes the role of the good teacher who is creative not only in his or her own work but also encourages activity learning in routine class procedure. The awards to teachers are small in cash value. The total science education profession, however, can well appreciate the values that accrue from making available to all teachers the reports of "best practices and most effective techniques" that are submitted in connection with the teacher phase of the program.

Inquiries regarding FSAF activities and publications may be addressed to the Future Scientists of America Foundation, NSTA, 1201 16th St., N. W., Washington 6, D. C.—Reprinted from *The Science Teacher,* Vol. XX, No. 5, October 1953.

Why B. I. S. R. A. Has Adopted the ASM-SLA Metallurgical Literature Classification

by P. E. Colinese, Assistant Information Officer
British Iron and Steel Research Association

The following is a condensation of a paper presented before the 28th Conference of Aslib (Association of Special Libraries and Information Bureaus) in September, 1953. It is published in *Aslib Proceedings*, Vol. 5, No. 4.

[There follows a description of the four indexes, the method of sorting, and the Work Book]

AT six-weekly intervals The British Iron and Steel Research Association issues a Report List containing abstracts of and references to its research reports. One list may contain between 25 and 50 abstracts. A classification system for these references is very necessary for the Association's Information Section. The system that has been used for the past seven years consists of a subject and author index and has grown and been amended so often that it has gradually become more unworkable as the diversity of our research work has increased.

Search for an alternative system

For about three and a half years we have therefore been looking for a suitable system to replace it and, briefly, our efforts can be summarized as follows:

(1) An attempt was made to produce our own tailor-made system. This showed promise when the basic iron and steel-making processes were considered but we could not visualize a scheme to cover such wide fields as mechanical working, plant engineering, physics, chemistry and metallurgy.

(2) We examined several other systems but all were rejected until we found the ASM/SLA Classification.

It may be asked why we did not adopt the U.D.C. We had three strong reasons for not using it: (*a*). It covers all branches of knowledge, therefore, metallurgical references are scattered through it. (*b*). It provides the branches and twigs which compose the tree of knowledge but as a Research Association we wish to know much more about the fibres which make up the twigs. (*c*). It imposes an artificial boundary between pure and applied science. This is perhaps the greatest objection because the fields of work of a Research Association, which links industry with fundamental science, are very close to, and in many cases cross, this ill-defined boundary.

Some of the other systems which were considered were rejected not because in our opinion they were bad, but because they did not fill our specification, which is outlined below.

Attributes of our 'ideal' system

(*i*) Iron and steel subjects must be dealt with in detail.

(*ii*) The system must allow of considerable expansion.

(*iii*) A minimum of cross-reference cards should be required.

(*iv*) Classifying reports, preparation and sorting of cards should be economical in equipment and labour.

(*v*) Chances of 'losing' a reference must be very small.

The limitations imposed by (*iv*) which caused us to reject many systems which might otherwise have been acceptable. . . .

Referring to the attributes which we wished any new system to possess, we found that the ASM/SLA classification possesses the first because it provides a logical and practical breakdown of the entire field of metallurgy, both ferrous and nonferrous. It affords a guide for an edge-punched card system of filing and the method of punching is such that there is ample scope for expansion (see *ii*), several cross-references may be punched on a card (see *iii*). As the cards are sorted by a hand-held needle it does not matter what order cards are in, hence the chances of losing a card are very small (see *v*). The equipment needed to operate the system consists of the punched cards, a hand punch, several needles for sorting, filing boxes for the cards and a work book. All this equipment has been obtained in this country except the work book. Preparation of cards is therefore simple, and as the classification is not difficult to learn, attribute (*iv*) has also been found.

The only imponderable at present is the time taken to sort cards. As we are only beginning to use the system and are still preparing the new cards we cannot make a definite observation on this point but, so far, indications are favorable.

The edge-punched card, with its double row of holes round the periphery, provides a large area in the center on which much information concerning a report may be handwritten, typed or affixed. References may be classified under one or more of five aspects, viz: (1) Processes. (2) Properties. (3) Materials. (4) Authors and (5) Common Variables. All are incorporated on the four edges of the card. Processes and Properties are combined into one index and these with the Materials index form the basic sections of the system. . . .

Limitations of the system

The perfect literature classification does not and may never exist; the ASM/SLA classification has a number of limitations and these were considered before the system was adopted. The main limitations are given below and have been accepted by our Information Section.

The maximum number of cards which can be handled comfortably is about 10,000. This is not a serious handicap to B.I.S.R.A. as the Iron and Steel Institute provides the Association's members with library services and abstracts world literature. It is only those reports which B.I.S.R.A. itself circulates that are being classified by the ASM/SLA system.

The novel Author Index has obvious limitations. No provision is made for distinguishing between A. Smith and B. Smith for example, and if more than one author's names are punched some of the selectivity of the direct index is lost.

Unwanted cards also constitute a certain limitation, particularly in the Author Index, but even with our very limited experience in operating the system we have found that a little thought before commencing to needle through the cards often reduces the number of unwanted cards by a large proportion. If one is searching for one particular card it is useful to remember that as four indexes are combined on each card it may be possible to obtain the wanted card very quickly by needling, say, through one letter of the author's name, then a particular material or process or a particular common variable.

Conclusion

We feel that the ASM/SLA classification will meet our special requirements as a Research Association and it is surprising how few have been the additions which we have so far made to the Processes and Properties Index. The cheapness of installing the system and the very low running costs commend themselves to small organizations. That staff with very little technical knowledge are being trained to use it is also noteworthy.

A. S. M. Review of Current Metal Literature

An Annotated Survey of Engineering, Scientific and Industrial Journals and Books Here and Abroad Received During the Past Month

Prepared in the Library of Battelle Memorial Institute, Columbus, Ohio

Stewart J. Stockett, Technical Abstracter

Assisted by Fred Body, Ardeth Holmes, Mildred Landon, T. Sparks and Members of the Translation Group

A
General Metallurgical

307-A. Controlled Heating and Air Conditioning in the Manufacture of Metal Products. Leo Walter. *Machinery (London)*, v. 83, Sept. 25, 1953, p. 619-622.

Diagrams, photographs. 6 ref. (A5)

308-A. Titanium Metallurgy. Hugh E. Voress, compiler. U. S. Atomic Energy Commission, TID-3039, Apr. 14, 1953, 57 p.

Bibliography of unclassified report literature containing 366 references. Includes author, subject and numerical indexes. (A10, Ti)

309-A. (German.) **Slagging of Cobalt From Cobalt-Containing Copper Melts.** Friedrich Johannsen and Klaus Emicke. *Zeitschrift für Erzbergbau und Metallhüttenwesen*, v. 6, no. 9, Sept. 1953, p. 341-348.

Concentrating Co in slag by slightly oxidizing the melt. Tables, graphs. 10 ref. (A8, Co, Cu)

310-A. Condensed Review of Some Recently Developed Materials. *Machinery*, v. 60, Oct. 1953, p. 169-187.

Tabular information on material, trade name, properties, applications and names and addresses of manufacturers of products. (A10)

311-A. Current Research on Heat Resistant Cast Alloys as Related to Nickel Conservation. Ernest A. Schoefer. *Industrial Heating*, v. 20, Oct. 1953, p. 1973, 1974, 1976, 1978, 1980, 1982, 2108-2113.

From an examination of past and present trends, predicts a nickel scarcity in future. Photographs, diagrams, graphs, tables. 3 ref. (A4, Ni)

312-A. Elimination of Defects in Metallurgical Plant. J. S. Caswell. *Iron and Steel Institute, Special Report no.* 48, Jan. 1953, p. 7-15.

Correct and efficient design of plant and machine parts; methods of experimental stress analysis; plant manufacture and erection; and operatives and plant operation. Photographs, diagrams. 6 ref. (A5, S general, Q25)

313-A. Safe Handling Practices With Magnesium. Neil Flammer. *Modern Metals*, v. 9, Oct. 1953, p. 35-36.

Magnesium and its alloys can be processed as safely as other commercial metals by following accepted methods. Procedures for foundries, heat treating installations and machine shops. Photograph, diagram. (A7, Mg)

314-A. (German.) **World Reserves and Production of Manganese Ores.** W. Gehr. *Metall*, v. 7, nos. 17-18, Sept. 1953, p. 729-738.

Data on ore classification, mineralogy, world reserves, markets, evaluation of ores, deposits and production in Europe, Russia, Asia, Africa, the Americas and Australia. Tables. 11 refs. (A4, B10, Mn)

315-A. (Hungarian.) **Processing of Tombac-Covered Iron-Plate Scrap by Electrolysis in Sodium Cyanide Solution.** Tibor Nagy. *Aluminium (Budapest)*, v. 5, no. 6, June 1953, p. 134-143.

Process and equipment for removal of brass plate. Tables, graphs. (A8, CN)

316-A. Steel Fabricating Plant. *Machinery Lloyd (Overseas Ed.)*, v. 25, Oct. 10, 1953, p. 107-109.

Equipment, plant layout and operating procedure. Photographs. (A5, F general, G general, ST)

317-A. (Book.) **Materials Handling Equipment and Methods in the U.S.A. Organization for European Economic Co-Operation.** 1953. 170 p. H.M. Stationery Office, London, England. 9s.

Construction and operation of conveyers, cranes, elevators, and other equipment. Examples of efficient handling organizations and procedures. (A5)

318-A. (Book.) **Metallurgical Dictionary.** J. G. Henderson and J. M. Bates. 396 p. 1953. Reinhold Publishing Corp. 330 W. 42nd st., New York 36, N. Y. $8.50.

Includes over 5000 informative definitions and descriptions covering all the most essential terms in both production and physical metallurgy. Designed as a source of information for scientists, engineers, technicians, specification writers, purchasing agents, architects, and builders. (A10)

B
Raw Materials and Ore Preparation

221-B. Nodulizing Iron Ores & Concentrates at Extaca Plant. R. L. Mennett, R. E. Hagan, and M. V. Mielke. *Skillings Mining Review*, v. 42, Oct. 17, 1953, p. 1-2, 4, 21, 23.

Nodulizing process, and experimental kiln installation. Photographs. (B16, Fe)

222-B. Report on Taconite. *Steelways*, v. 9, Oct. 1953, p. 1-5.

Progress in developing commercial concentration methods. Photographs, diagrams. (B14, Fe)

223-B. Porosity and Adsorptivity in Iron Ores From New Quebec Compared With Standard Ores. Jean Laneuville. *Laboratories Branch, Dept. of Mines*, Province of Quebec, Canada, P. R. No. 277, 1953, 18 p.

Research carried out on eight samples. Volumes of Hg, H_2O, H_2, air and CO_2 penetrating the pores of each ore measured. Tables, diagram, graphs. (B10, Fe)

224-B. (French.) **Some Recent Progress in Ore Concentration and the Production of Nonferrous Metals.** Maurice Rey. *Revue universelle des mines*, v. 9, ser. 9, no. 7, July 1953, p. 417-424.

Mechanical, chemical and thermal procedures. (B14, C general, EG-a)

225-B. Heavy-Media Separation Processes for Mineral Concentration. *American Cyanamid Company, Mineral Dressing Notes*, no. 19, May 1953, 32 p.

Representative plants for iron, lead, zinc, lead-zinc, fluorspar, tin, diamondiferous, chrome and manganese ores; and for magnesite, dolomite, andalusite, gravel, brucite and coal. Photographs, diagrams. 82 ref. (B14)

226-B. Refractory Policy and Control. G. Reginald Bashforth. *British Steelmaker*, v. 19, Oct. 1953, p. 586-594.

Progress made in silica, basic and fireclay refractories for steelmaking. Desirable qualifications of a steelworks refractory officer and functions which he should fulfill. Tables, photograph. 10 ref. (B19, D general)

227-B. FluoSolids Roasting of Zinc Concentrates for Contact Acid. T. T. Anderson and R. Bolduc. *Chemical Engineering Progress*, v. 49, Oct. 1953, p. 527-532.

Design problems and development of the first commercial plant in North America for roasting process. Diagrams, graph, table. (B15, Zn)

228-B. Carbon in the Engineering and Metallurgical Industries. II. Industrial Carbons. V. S. Kingswood. *Metallurgia*, v. 48, no. 287, Sept. 1953, p. 133-138.

Production of industrial carbons and typical applications. Tables, photographs, graph, diagram. 6 ref. (B22, C)

229-B. Power and Stability of Flotation Frothers. Governing Factors. S. A. Wrobel. *Mine & Quarry Engineering*, v. 19, Oct. 1953, p. 363-367.

Factors relating to froth stability and power. Hypotheses for phenom-

The coding symbols at the end of the abstracts refer to the ASM-SLA Metallurgical Literature Classification. For details write to the American Society for Metals, 7301 Euclid Ave., Cleveland 3, Ohio.

ena of froth formation. Diagrams. (B14)

230-B. The Sydvaranger Story. *Mining World,* v. 15, Oct. 1953, p. 49-72, 74-76.

Group of articles covering history of taconite operations in Norway, geology of the area, ore removal and processing, mill equipment and power generation. (B general, Fe)

231-B. (English.) **Contributions to the Classical Theory of Jigging.** G. Tarjan. *Acta Technica Academia Scientiarum Hungaricae,* v. 6, nos. 1-2, 1953, p. 79-121.

Motion of a solid body in a pulsating up-and-down current. Tables, graphs, diagrams. (B14)

232-B. Studies in the Carbonate Leaching of Uranium Ores. I. Description of the Pressure Leach Process and Its Application to Pitchblende Ores. F. A. Forward and J. Halpern. **II. Kinetics of the Dissolution of Pitchblends.** E. Peters and J. Halpern. **III. Precipitation of Uranium from Carbonate Solutions by Reduction With Hydrogen.** F. A. Forward and J. Halpern. *Canadian Mining and Metallurgical Bulletin,* v. 46, no. 498, Oct. 1953, p. 634-648; *Canadian Institute of Mining and Metallurgy, Transactions,* v. 56, 1953, p. 344-358.

Tables, graphs. 19 ref. (B14, U)

233-B. Metallurgical Investigations of Southeastern Missouri Cobalt-Nickel Resources. H. Kenworthy and K. K. Kershner. *U. S. Bureau of Mines, Report of Investigations* 4999, Sept. 1953, 37 p.

Sulfide-ore concentrates were treated successfully on a laboratory scale to recover more than 90% of the cobalt, nickel and copper. Commercial treatment netted a recovery of over 75% of the cobalt and about 90% of the nickel and copper in the form of a lead-zinc fume, a copper sulfide concentrate, and a cobalt-nickel-iron product. Tables, micrographs, diagrams. 44 ref. (B10, B14, Co, Ni, Pb, Zn, Fe, Cu)

C
Nonferrous Extraction and Refining

165-C. Flash Smelting Improves Harjavalta's Metallurgy. Fernando Benitez. *Engineering and Mining Journal,* v. 154, Oct. 1953, p. 76-80.

Smelting of Cu ores. Photograph, diagrams, graphs, tables. (C21, Cu)

166-C. Metal Melting Under Vacuum. *Foundry Trade Journal,* v. 95, Sept. 17, 1953, p. 365-367.

Mechanical problems associated with process and available solutions. Photographs, diagrams, graphs. (C25)

167-C. Continuous Casting of Copper Alloy Shapes. *Metal Industry,* v. 83, Sept. 18, 1953, p. 235-236.

Casting furnace and dies. Structure and quality of the castings. Photographs, diagram, table. (C5, Cu)

168-C. Vacuum Melting Developments. *Metal Industry,* v. 83, Sept. 25, 1953, p. 263-264.

Recent developments in Switzerland. Graph, diagrams, photographs. (C25)

169-C. Accessories in Nickel Converter Practice. C. C. Downie. *Mining Journal,* v. 241, Sept. 25, 1953, p. 360-361.

Improvements now established in practice and others requiring further research. (C21, Ni)

170-C. (German.) **The Coreless Induction Furnace.** W. Scheibe. *Metall,* v. 7, nos. 17-18, Sept. 1953, p. 698-700.

Economic aspects and uses. Theoretical fundamentals. Diagrams, photograph. 11 ref. (C21, D6)

171-C. (German.) **Several Problems in High-Vacuum Metallurgy.** W. Scheibe. *Metall,* v. 7, nos. 19-20, Oct. 1953, p. 751-754.

Annealing, melting, sintering, distilling and sublimating methods of purifying metals. Special attention to melting of titanium by electric arc and suspension methods. Graphs, photographs, diagrams. (C25, J23, H15, Al, Cu, Fe, Ti, Ag, Pt)

172-C. (German.) **Melting Metals Without Contamination by Crucible Reaction.** Otto Winkler. *Zeitschrift für Metallkunde,* v. 44, no. 8, Aug. 1953, p. 333-341.

Arc melting and melting by induction using electromagnetic suspension or drip melting from a bar. Diagrams, photographs. 21 ref. (C21, Cu, Cr, Mo)

173-C. Magnesium Production. *Metal Industry,* v. 83, Oct. 9, 1953, p. 295-298.

Equipment, plant layout and procedures of only magnesium works in United Kingdom. Photographs. (C general, Mg)

174-C. Some Aspects of Vacuum-Melted Metal. J. H. Moore. *Metal Progress,* v. 64, Oct. 1953, p. 103, 105.

Advantages of refining metal under reduced atmospheric pressure. Graphs. (C25)

175-C. (Polish.) **Production of Lead-Calcium Alloys.** Z. Maslanka-Ormanowa. *Prace Instytutow Hutnictwa,* v. 5, no. 2, 1953, p. 89-104.

Methods of production. Tables, graphs. 9 ref. (C general, Pb)

176-C. (Portuguese.) **General Principles Used in Pyrometallurgical Processes of Tin Refining.** Tharcisio D. de Souza Santos. *ABM (Boletim de associacao brasileira de metais),* v. 9, no. 31, Apr. 1953, p. 199-218.

Separation of the aggregate phase, the liquids-solids separation and the refining processes based on differences in temperature, pressure and concentration. 16 ref. (C21, Sn)

177-C. (Portuguese.) **Practical Aspects of the Parkes Process for Separating Silver From Lead in the Refining Installation of the Institute of Technical Research.** Tharcisio D. de Souza Santos. *ABM (Boletim da associacao brasileira de metais),* v. 9, no. 31, Apr. 1953, p. 219-234.

Three phases in which the above work is done. Equipment and technique. Tables, graphs. 7 ref. (C21, Pb, Ag)

D
Ferrous Reduction and Refining

363-D. (French.) **Preparation of Blast Furnace Burden Using Lorraine Minettes.** Paul Thierry. *Métallurgie et la construction méchanique,* v. 85, no. 8, Aug. 1953, p. 603, 605.

Greenwalt, G.H.H. and Dwight-Lloyd processes. (To be continued.) (D1)

364-D. New Skinningrove Blast-Furnace. H. G. W. Debenham and W. H. Tubbs. *Iron & Steel,* v. 26, Oct. 1953, p. 460-467.

Equipment, plant layout and operating procedures. Diagrams, photographs. (To be concluded.) (D1, CI)

365-D. Some Factors Affecting Productivity in a Cold-Metal Open-Hearth Shop. W. S. Walker. *Iron and Steel Institute, Special Report no.* 48, Jan. 1953, p. 17-23.

Effect on productivity of the five constituent parts of the production cycle and factors that influence them. Results of tests. Graphs, diagrams, photographs. 3 ref. (D2, S18)

366-D. Blast-Furnace Practice at Redcar Works. A. T. Ledgard. *Iron and Steel Institute, Special Report no.* 48, Jan. 1953, p. 24-36.

Operation of two blast furnaces of identical design. (D1)

367-D. Some Recent Developments in Steel Production and Products. William A. Dennis. *Journal of Chemical Education,* v. 30, Oct. 1953, p. 491-495.

As applied to iron ore; blast, open-hearth and bessemer furnaces; turmohearth process; rolling and hot-extrusion; and products. Photographs. 8 ref. (D general, ST)

368-D. American Arc Furnace Practice. W. B. Wallis. *Mining Journal,* v. 241, Oct. 9, 1953, p. 416-417.

Developments in construction and operation in steelmaking. (D5, ST)

369-D. Status Report on Continuous Casting. W. B. Pierce. *Steel,* v. 133, Oct. 12, 1953, p. 256-258, 260, 262, 265-266, 268-269, 271-272.

Process and equipment at one plant. Diagrams, photographs. (D9)

370-D. (French.) **Systematic Study by Means of Yield Charts of the Factors Determining the "Blowability" of Charges in the Basic Bessemer Converter.** P. Leroy, M. Gombert and B. Trentini. *Revue de Métallurgie,* v. 50, no. 9, Sept. 1953, p. 642-664.

Effect of the total area of blowing orifices determined during a progressive decrease in the number of orifices. Comparisons based on quality of the heat and permeability of the charge. Tables. (D3)

371-D. (French.) **Killed Basic Bessemer Steels.** Marc Allard. *Revue universelle des mines,* v. 9, ser. 9, no. 8, Aug. 1953, p. 563-568; disc., 568-570.

Possibilities of obtaining steels by the Bessemer process which are superior to ordinary openhearth steels. Table. (D3, ST)

372-D. (German.) **The Low Shaft Furnace Industry.** Heinz Schumacher. *Revue universelle des mines,* v. 9, ser. 9, no. 8, Aug. 1953, p. 493-504; disc., 504-511.

Advantages of using increased amounts of O_2 in steelmaking. Tables, graphs, diagrams. (D1, ST)

373-D. (German.) **Hydrodynamic Study of Liquid Movements in the Basic Bessemer Converter.** P. Leroy. *Revue universelle des mines,* v. 9, ser. 9, no. 8, Aug. 1953, p. 512-539; disc., 539-546.

Geometrical and physico-chemical factors influencing action of blast on melt. Diagrams, graphs. 13 ref. (D3)

374-D. (German.) **Report on the Production of Improved Converter Steel in the Low-Shaft Converter.** K. E. Mayer and H. Knuppel. *Revue universelle des mines,* v. 9, ser. 9, no. 8, Aug. 1953, p. 571-597.

Influence of nitrogen, oxygen, phosphorus and carbon on ductility and tendency to brittleness of steel. Graphs, tables, diagram. 47 ref. (D3, ST)

375-D. (German.) **Contribution to the Improvement of the Life of Basic Converters and Bottoms.** David Bird. *Stahl und Eisen,* v. 73, no. 21, Oct. 1953, p. 1337-1338.

Improvement of converter life and quality of steel is obtained by use of "3-4-1" dolomite lining. Tables, diagrams. 5 ref. (D3, ST)

376-D. (German.) **Investigation of the Tar for Converter Floors.** Raimond Calaque. *Stahl und Eisen,* v. 73, no. 21, Oct. 1953, p. 1339.

Life of converter is greatly influenced by tar as a binder. Table. (D3)

377-D. (Hungarian.) **Decreasing the Coke Needs in Pig Iron Production.** Laszlo Visnyovszky. *Kohaszati Lapok,* v. 8, no. 5, May 1953, p. 97-107; no. 6, June 1953, p. 121-126.

Proposes various methods on basis of Hungarian industrial experience. Additions of quicklime and dolomite. Protection against heat losses and control of amount of slag. Tables, graphs. 11 ref. (D1, Fe)

378-D. Here's How the J & L Steel Corp. Makes Its Blast-Furnace Gas Yield Rich Iron Ore. W. A. Walton. *Power,* v. 97, Nov. 1953, p. 95-97, 218, 220.

Equipment, plant layout and operating procedures. Photographs. (D1, Fe)

379-D. (Dutch.) **Gas in Pig and Cast Iron.** J. E. Degraaf. *Metalen,* v. 8, no. 17, Sept. 1953, p. 319-324.

Compares solubility of hydrogen, nitrogen and oxygen with gas content actually found. Supersaturation was proven to be frequent. Tables, graphs. 20 ref. (D1, E25, CI)

380-D. (French.) **Improving Basic Bessemer Steel. Utilization of Oxygen.** M. Allard. *Centre de Documentation Siderurgique, Circulaire d'Informations Techniques,* 1953, no. 10, p. 1585-1589.

Possibilities and problems of changes effected in the charge, desulfurization, normalizing the nitrogen content and decreasing phosphorus content. (D3, ST)

381-D. (French.) **The Conditions for a Favorable Distribution of Materials in the Blast Furnace.** Jean Vibrac. *Métallurgie et la construction mécanique,* v. 85, no. 9, Sept. 1953, p. 685-693.

Importance of correct distribution of charge and factors determining it. Calculations. Diagrams, graphs, table. (To be continued.) (D1)

382-D. (German.) **Bath Currents in the Converter and Nitrogen Content of Steel.** Karl Dacves. *Stahl und Eisen,* v. 73, no. 20, Sept. 24, 1953, p. 1280-1282.

Effects of converter design and low bath levels on reduced nitrogen content. Graphs, diagrams, photographs. 6 ref. (D3, ST)

383-D. (German.) **The Movement of Steel in the Converter.** Fritz Schultz-Grunow. *Stahl und Eisen,* v. 73, no. 20, Sept. 24, 1953, p. 1282-1284.

Experiments conducted in a "Plexiglas" model. Photographs, diagrams. (D3, ST)

E
Foundry

583-E. An Analytical Study of the Die-Casting Process. Bruno Sachs. *ASTM Bulletin,* 1953, no. 192, p. 27-37.

Quality requirements, types of machines, and die-casting operations. Tables, diagrams, graphs. 20 ref. (E13)

584-E. Coke Quality and Carbon Pickup. C. R. Austin. *Foundry,* v. 81, Oct. 1953, p. 116-121, 234.

Tests intended to evaluate behavior of coke in the cupola, particularly with regard to its carburization power. Graphs, tables, micrographs, photograph. (E10, CI)

585-E. Determination of Feeding Systems. Robert A. Cech. *Foundry,* v. 81, Oct. 1953, p. 128-131.

Method employed to determine feeder requirements of steel castings which has proved successful in improving soundness and yield. Diagrams, graphs. 7 ref. (E23, CI)

586-E. Shell Molding. What Does It Cost? Walter W. Coleman. *Foundry,* v. 81, Oct. 1953, p. 156, 158, 190-192.

Typical layout and production and cost data for shell mold foundry requiring 6 to 8 men. Diagram, table, photographs. (E16, CI)

587-E. Inter-Relation of Combustion and Metallurgical Reactions in the Cupola. D. Fleming. *Foundry Trade Journal,* v. 95, Sept. 17, 1953, p. 349-358.

Effects of C:Fe ratio, coke size and blast temperature. Controls necessary for production of gray iron without pig iron. Graphs, diagrams, table. 5 ref. (To be continued.) (E10, CI)

588-E. Effect of Pouring Conditions on Shrinkage Unsoundness in Bronze Ingots Cast in Metal, Carbon or Sand Moulds. W. T. Pell-Walpole. *Foundry Trade Journal,* v. 95, Sept. 24, 1953, p. 381-388; disc., p. 388-389.

Details of work to determine effect of rate and temperature of pouring on bronze cast in molds of widely differing thermal characteristics. Graphs, tables. 11 ref. (E23, E25, Cu)

589-E. Inter-Relation of Combustion and Metallurgical Reactions in the Cupola. D. Fleming. *Foundry Trade Journal,* v. 95, Sept. 24, 1953, p. 401-403; disc., p. 403-405.

Zone III reactions, hearth reactions, desulfurization, C control and ideal melting conditions. Graphs. 8 ref. (E10, E25)

590-E. Feeding of Steel Castings at Greater-Than-Atmospheric Pressures. Charles W. Briggs and Howard F. Taylor. *Foundry Trade Journal,* v. 95, Oct. 1, 1953, p. 413-422.

Principles of feeding. Apparatus and applications whereby gas pressures above atmospheric can be applied to freezing castings. Diagrams, photographs, tables. 8 ref. (To be continued.) (E23, CI)

591-E. Cast Iron for Enamelling. *Foundry Trade Journal,* v. 95, Oct. 1, 1953, p. 433-434.

Precautions in production of cast iron for enameling. (E general, L27, CI)

592-E. Making Castings by Shell Mold and Investment Processes. Robert R. Dohrmann. *General Motors Engineering Journal,* v. 1, Sept.-Oct. 1953, p. 8-11.

Processes and advantages of each. Photographs. (E15, E16)

593-E. Use of Foam Plaster Process for Making Aluminum Alloy Torque Converter Castings. Kenneth B. Bly. *General Motors Engineering Journal,* v. 1, Sept.-Oct. 1953, p. 13-15.

Process providing wider range of core permeability by altering foam volume. Micrographs, photographs. 4 ref. (E16, Al)

594-E. Lost-Wax Precision Casting. *Machinery (London),* v. 83, Oct. 2, 1953, p. 651-656.

Preparation of molds, casting and sand reclamation plant. Photographs. (E15)

595-E. Fused Die Castings. Herbert Chase. *Materials & Methods,* v. 38, Oct. 1953, p. 119.

Procedure to obtain limited quantities of special shapes at low cost. Photograph. (E13)

596-E. Die-Castings in the Lock Industry. *Metal Industry,* v. 83, Sept. 18, 1953, p. 237-241.

Advantages of die-cast parts over parts made by simple casting. (E13)

597-E. Melting Practice for Investment Casting. Sam Tour. *Precision Metal Molding,* v. 11, Oct. 1953, p. 64-65, 91-94.

Control of raw materials and design of melting equipment. Photographs. (E15)

598-E. Die Lubricants. II. V. W. Smith. *Precision Metal Molding,* v. 11, Oct. 1953, p. 102-108.

Six lubricants for die casting dies. Photographs. (E13)

599-E. (French.) **Use of Scrap Iron in the Cupola Furnace.** Charles Dennery. *Fonderie,* 1953, Aug. no. 91, p. 3539-3555.

Thermal, physico-chemical, metallurgical and pure foundry aspects. Diagrams, graphs, photographs. 12 ref. (E10, Fe)

600-E. (French.) **Cupola Furnace and Superheating of the Cast Iron.** J. Pascal. *Métallurgie et la construction méchanique,* v. 85, no. 7, July 1953, p. 547-551; no. 8, Aug. 1953, p. 607-609.

Various types of furnaces and blast practices. Diagrams, graphs. (To be continued.) (E10, CI)

601-E. (French.) **Lubrication and Luting of Foundry Equipment Which Operates Under Pressure.** R. Grunberg. *Métallurgie et la construction méchanique,* v. 85, no. 8, Aug. 1953, p. 611, 613-614.

Selection of materials for specific applications. Diagram. (E general, A5)

602-E. (German.) **Revisions of German Industrial Standard DIN 52401: "Testing of Foundry Sand".** H. Jungbluth. *Giesserei,* v. 40, no. 17, Aug. 20, 1953, p. 421-427.

Conforms closely with American standard. Graphs, tables. (E18, S22)

603-E. (German.) **Clylindrical Test Block for Determining the Properties of Compressed Molding Sand.** W. Götz. *Giesserei,* v. 40, no. 19, Sept. 1953, p. 469-477.

Test methods for determining strength and permeability. Photographs, tables, graphs. 12 ref. (E18)

604-E. (German.) **High-Test Cast Iron, Especially Cast Iron With Compact to Spherical Graphite Structure.** E. Piwowarsky. *Giesserei,* v. 40, no. 19, Sept. 1953, p. 477-482.

Production of high-test ductile cast iron without the use of Mg or Ce. Graph, micrographs. 17 ref. (E25, CI)

605-E. (German.) **Molds for Cast Iron Worm Shafts and Conveyor Screws.** *Giesserei,* v. 40, no. 19, Sept. 1953, p. 486-488.

Production of patterns and molds. Diagrams. (E17, CI)

606-E. Report of Committee A-3 on Cast Iron. J. S. Vanick, chairman. *American Society for Testing Materials, Preprint* no. 2, 1953, 6 p.

Proposed tentative methods of chill testing cast iron. Diagrams, tables. (E25, CI)

607-E. Production of Diesel-Engine Castings in Grey Iron. J. R. Charlton. *Institute of British Foundrymen. Paper* no. 1064, 1953, 9 p.

Methods adopted in the production of iron castings for diesel engines in a jobbing foundry. Photographs. (E11)

608-E. Survey of the Shell-Moulding Method of Casting Production. Bernard N. Ames. *Institute of British Foundrymen, Paper* no. 1058, 1953, 24 p.

Mechanics of process, metallurgical evaluations, mechanization, plant safety, dimensional tolerance, gating and heading, applications and economics. Photographs, graphs. 26 ref. (E16)

609-E. Pelleted Foundry Pitch. E. Brett Davies, T. F. N. Matthews and G. Smart. *Institute of British*

Foundrymen, Paper no. 1060, 1953, 5 p.
Use of pulverized coal-tar pitch as an additive to foundry sand. Photographs, graphs, tables. (E18)

610-E. Effects of Mould Resistance on Internal Stress in Sand Castings. R. N. Parkins and A. Cowan. *Institute of British Foundrymen, Paper* no. 1062, 7 p.
Measurements made on castings to determine whether surrounding mold material offers restraint to the contraction of the casting as it cools. Relation of restraint to high-temperature strength of the sand. Diagrams, tables. 5 ref. (E11, E25)

611-E. Inter-Relation of Combustion and Metallurgical Reactions in the Cupola. D. Fleming. *Institute of British Foundrymen, Paper* no. 1065, 1953, 13 p.
Experimental work. Diagrams, graphs. 13 ref. (E10, CI)

612-E. "Foundry" Development in the Textile Industry. B. Gale. *Institute of British Foundrymen, Paper* no. 1066, 1953, 15 p.
Foundry production of castings for the machinery employed to manufacture yarns. Types of machines, methods of production and metallurgical aspects. Photographs. (E general, CI)

613-E. Effect of Pouring Conditions on Shrinkage Unsoundness in Bronze Ingots Cast in Metal, Carbon or Sand Moulds. W. T. Pell-Walpole. *Institute of British Foundrymen, Paper* no. 1067, 1953, 8 p.
Optimum pouring rates to suit various pouring conditions; their applications. Graphs, tables. 11 ref. (E23, Cu)

614-E. Difficulties in the Production of Centrifugally-Cast Nickel-Bronze Bearing Shells. J. Taylor, Z. Stokowiec and R. S. Jackson. *Institute of British Foundrymen, Paper* no. 1068, 1953, 9 p.
Mechanism of bubble formation, gas porosity, location of the defective metal, changes in solidification process and lead segregation. Tables, micrographs, diagrams. (E14, Ni, Cu)

615-E. Economic Utilization of Copper-Base Alloys. *Institute of British Foundrymen, Paper* no. 1069, 1953, 9 p.
Foundry and design factors. Tables. 6 ref. (E general, Cu)

616-E. Feeding of Steel Castings at Greater-Than-Atmospheric Pressures. Charles W. Briggs and Howard F. Taylor. *Institute of British Foundrymen, Paper* no. 1070, 1953, 18 p.
Principles established from previous work. Apparatus and applications. Results analyzed and conclusions drawn. Diagrams, micrographs, tables. 17 ref. (E23, ST)

617-E. Mould-Reaction in Aluminium-Alloy Castings. Marjorie Whitaker. *Institute of British Foundrymen, Paper* no. 1072, 1953, 9 p.
Investigation and results. Micrographs, tables. 13 ref. (E12, Al)

618-E. Organic Fillers Seal Defects in Metal Products. Helmut Thielsch. *Iron Age,* v. 172, Oct. 15, 1953, p. 118-121.
Two groups of organic fillers which permit salvaging rejected cast and welded parts. Tables, photographs. (E general, K general, A8)

619-E. Flow Properties of Foundry Sand. J. Gittus. *Iron & Steel,* v. 26, Oct. 1953, p. 475-478.
Implications of bond energy ratio with regard to green strength, shatter, loose flow and sieve tests. Graphs, photographs. 3 ref. (E18)

620-E. High Speed Production of Aluminum Gears by Die Casting. Elliot L. Lewis. *Light Metal Age,* v. 11, Oct. 1953, p. 12-13, 28.
Equipment, process and applications. Photographs, table. (E13, Al)

621-E. Tin Founding. W. D. Arnot. *Mechanical World and Engineering Record,* v. 133, Oct. 1953, p. 446-448.
Development of process for making small castings in pure metal. Photographs. (E general, Sn)

622-E. Metal Casting Methods. VI. Die Casting and Investment Casting. J. B. McIntyre. *Metallurgia,* v. 48, no. 287, Sept. 1953, p. 123-129.
Methods of production of shaped castings by reference to slush, press, pressure die, gravity die and investment casting techniques. Photographs. 17 ref. (E13, E15)

623-E. Sealing Castings for Air Tightness. Gilbert C. Close. *Western Machinery and Steel World,* v. 44, Oct. 1953, p. 98-100.
How castings may be sealed in fabricating optical range finders. Photographs. (E25)

624-E. (German.) **Formation of Shrink Holes in Gray Cast Iron.** L. Hutter. *Giesserei,* v. 40, no. 18, Sept. 1953, p. 454-457.
Hole formation depended on amount of eutectically separated graphite. Influence of silicon. Graphs, diagram. 8 ref. (E25, CI)

625-E. (German.) **Sand Testing by Swedish, German, and American Standards.** E. O. Lissell and O. Carlsson. *Giesserei,* v. 40, no. 18, Sept. 1953, p. 445-454.
Tensile strength and permeability tests on samples from the three countries. Tables, graphs, diagrams. 11 ref. (E18)

626-E. (German.) **Production of Thin Walled Gray Cast Cylinders.** August Winter. *Giesserei,* v. 40, no. 18, Sept. 1953, p. 460-462.
Special attention to mixing of forming sand, charging and manner of gating. Diagrams. (E18, E22, CI)

627-E. (Hungarian.) **1952 Hungarian Experiments on the Production of Nodular Chilled Iron Rolls.** Bela Koros. *Öntöde,* v. 4, no. 5, May 1953, p. 97-103.
Core strength and wear resistance tests following magnesium additions. Tables, micrographs. 37 ref. (E25, Q23, Q9, Mg, CI)

628-E. High-Speed Control With Automatic Sand System. *American Foundryman,* v. 24, Nov. 1953, p. 36-39.
Equipment, plant layout and operating procedures. Photographs, diagram, table. (E18)

629-E. Planning a System for Materials Handling. K. Ennard and F. Lange. *American Foundryman,* v. 24, Nov. 1953, p. 42-47.
Equipment, plant layout and operating procedures including handling of raw materials, use of elevator for coke, charging of cupola, selection of core oven, and cooling methods for castings. Photographs, diagrams. (E general, A5)

630-E. Relation of Riser Range and Feeder Adequacy. I. William S. Pellini. *American Foundryman,* v. 24, Nov. 1953, p. 58-66.
Results of studies related to solidification of castings and to riser action. Diagrams, photographs, graphs, table. (To be concluded.) (E22)

631-E. The Die Casting Industry and Zinc. J. P. de Wet. *Canadian Mining Journal,* v. 74, Oct. 1953, p. 67-70.
History, present techniques, choice of alloy, terminology, contributions to industrial progress and suitability of zinc. Photographs. (E13, Zn)

632-E. Foundry Practice. V. Moulding and Coremaking. William H. Salmon and Eric N. Simons. *Edgar Allen News,* v. 32, Oct. 1953, p. 231-232.
Discussion of skeleton patterns and strickles and sweeps. Takes up machine molding. Diagrams. (To be continued.) (E19, E21)

633-E. Graphite Spherulite Formation and Growth. Albert De Sy. *Foundry,* v. 81, Nov. 1953, p. 100-103, 210, 212, 218, 220.
Tentative complete theory and experimental results which give accurate details on mechanism of the above. Photographs, diagrams. 10 ref. (E25, CI)

634-E. Large Wood Patternmaking. M. J. Kellner and G. H. Gorsuch. *Foundry,* v. 81, Nov. 1953, p. 104, 282-285.
Classes of patterns and techniques in construction. Photographs. (E17)

635-E. Aluminum Foundry Has Three Strings for Its Bow. Edwin Bremer. *Foundry,* v. 81, Nov. 1953, p. 116-119, 290-291.
Equipment, plant layout and operating procedures. Photographs, diagrams. (E general, Al)

636-E. Automatic Control of Sand Moisture. Erle F. Ross. *Foundry,* v. 81, Nov. 1953, p. 120-123, 184.
Equipment and techniques resulting in improved quality and finish of castings. Photographs, diagrams. (E18)

637-E. Back-Up Material for Shell Molds. William O. Faxon. *Foundry,* v. 81, Nov. 1953, p. 178, 180, 183-184.
Considerations in choice of the above. Photograph, diagrams, graph. (E16)

638-E. Feeding of Steel Castings at Greater-Than-Atmospheric Pressures. Charles W. Briggs and Howard F. Taylor. *Foundry Trade Journal,* v. 95, Oct. 8, 1953, p. 447-454.
Reports no dependable improvement in efficiency from using increased pressures except in isolated cases where low positive pressures were found more beneficial than high. Diagrams, photographs. 9 ref. (E22, CI)

639-E. Cast-Iron Gutter Manufacture. *Foundry Trade Journal,* v. 95, Oct. 8, 1953, p. 457-459.
Equipment and process. Suggests its adaptation to production of other types of castings. Photographs. (E general, T26, CI)

640-E. Effect of Stripping Time on the Structure of Chill-Cast Irons. G. J. Shaw and V. Kondic. *Foundry Trade Journal,* v. 95, Oct. 15, 1953, p. 473-478.
Experiments showed that the shorter the time casting is in mold, the greater the likelihood of obtaining carbon in graphitic form throughout cross section of casting. Tables, photographs, diagram, graph. 6 ref. (E25, CI)

641-E. Coleman - Wallwork Shell Mould Making Machine. *Machinery (London),* v. 83, Oct. 9, 1953, p. 722-724.
Design and use. Photographs. (To be continued.) (E16)

642-E. Clamping Shell Moulds. *Machinery Lloyd (Overseas Ed.),* v. 25, Oct. 10, 1953, p. 85.
Problems of holding halves of molds together and giving them support when casting metal is poured. Photographs. (E16)

643-E. Thompson Products Adopts Low Cost, High-Quality Shell Mold Casting Process. William Achor. *Western Metals,* v. 11, Oct. 1953, p. 72-74.
Equipment, plant layout and procedures. Photographs. (E16)

644-E. (German.) **An Interesting Medium-Frequency Furnace for Melting Aluminium.** K.-H. Brokmeier. *Aluminium,* v. 29, no. 10, Oct. 1953, p. 417-423.
Design and results obtained. Diagrams, graphs, photographs. (E10, Al)

645-E. (German.) **Experiments With Hematite Pig Iron in Gray and Malleable Iron Foundries.** C. W. Pfannen-

schmidt. *Giesserei*, v. 40, no. 20, Oct. 1953, p. 505-510.
Behavior of gases in cast iron. Tables, photographs. 19 ref. (E10, CI)

646-E. (German.) **Oxygen and Nitrogen Contents of Hematite Pig Iron and the Finished Casting After Remelting in Different Furnaces.** J. Willems, R. Optiz, M. Paschke, and C. W. Pfannenschmidt. *Giesserei*, v. 40, no. 20, Oct. 1953, p. 510-516.
Melting reduces oxygen content and increases the nitrogen content. Effects of different furnace types. Stresses importance of good melting practices. Tables, graphs, photographs. 23 ref. (E10, CI)

647-E. (German.) **Effect of the Composition of the Charge on Malleable Iron From the Cupola Furnace.** H. Siegel. *Giesserei*, v. 40, no. 20, Oct. 1953, p. 516-527.
Causes of defective castings. Photographs, tables, diagrams, graphs. (E10, CI)

648-E. (German.) **Inductively Heated Melting and Holding Furnaces.** E. Bertram. *Giesserei*, v. 40, no. 20, Oct. 1953, p. 527-533.
Advantages, designs, data on energy consumption and effect of operating time on energy consumption. Principles of crucible furnaces and possible application of low-frequency furnaces. Diagrams, tables, graphs. 3 ref. (E10)

649-E. (German.) **The Technique of Melting and Casting Under High Vacuum.** Otto Winkler. *Stahl und Eisen*, v. 73, no. 20, Sept. 24, 1953, p. 1261-1267; disc., p. 1267-1268.
Design, operation and casting procedure. Effect on chemical composition of the metal. Diagrams, graph, table. 5 ref. (E10, C25, D8)

650-E. (Swedish.) **Some Experiences in Systematizing Molding of Large Castings.** Gunnar Aberg. *Gjuteriet*, v. 43, no. 8, Aug. 1953, p. 137-142.
Advantages of molding with cores and in cement sand. Various methods. Photographs. (E19)

651-E. (Book-German.) **(Defects of Cast Pieces. Causes and Prevention.) Fehlererscheinungen an Gusstücken. Ursachen und Vermeidung.** E. Knipp. 275 p. Verlag Stahleisen m.b.H., Dusseldorf, Germany.
Collection of practical observations and theoretical considerations for use by research and industry. (E25)

652-E. (Book—German.) **(Design of Pressure Cast Parts. Die and Pressure Casting.) Gestaltung von Druckgussteilen (Spritz- und Pressguss).** Gustav Lieby. 157 p. 1953. Franckh'sche Verlags-Handlung, Stuttgart, Germany.
Handbook on design of equipment, dies, molds, and parts. Procedures for casting low and high-melting, light and heavy metals. (E13)

F

Primary Mechanical Working

257-F. Some Aspects of the Hot-Extrusion and Piercing of Copper and Copper Alloy Billets for Tube Manufacture. I. Flow and Lubrication in Tube Extrusion. Clement Blazey. **II. Rotary Piercing.** Robert J. B. Pearson. *Australasian Engineer*, 1953, Aug. 7, p. 53-60.
Diagrams. 19 ref. (F24, F26, Cu)

258-F. Cold Extrusion of Steel. *Machinery (London)*, v. 83, Oct. 2, 1953, p. 657-662.
Tool design and die steels. Diagrams, tables. 4 ref. (F24, TS)

259-F. Non-Ferrous Wire Production. *Metal Industry*, v. 83, Sept. 25, 1953, p. 255-258.
Wire rolling and drawing processes. Photographs. (F28)

260-F. A Nickel-Free Austenitic Steel for High-Strength Wire. H. O. McIntire and G. K. Manning. *Wire and Wire Products*, v. 28, Oct. 1953, p. 1019, 1022-1026.
Development of an alloy low in scarce elements and suitable for drawing into nonmagnetic wire. Tables, graphs, photographs. (F28, AY)

261-F. Processing of Phosphor Bronze Wire. Earle W. Lovering. *Wire and Wire Products*, v. 28, Oct. 1953, p. 1039-1041.
Common bronzes and their properties. Tables, graphs, photographs. (F28, Cu)

262-F. The Drawing of Shaped Steel Wire. Vito J. Vitelli. *Wire and Wire Products*, v. 28, Oct. 1953, p. 1042-1043, 1046.
Continuous process. Photographs, diagrams. (F28, ST)

263-F. Components of Wire Drawing Lubricants. Leon Salz. *Wire and Wire Products*, v. 28, Oct. 1953, p. 1056-1058, 1125.
Various components and their purposes. Photograph, table. (F28, F1)

264-F. Forging Tolerances. H. G. Conway. *Aircraft Production*, v. 25, Oct. 1953, p. 358-361.
Sources of error, tolerance standards and their application. Graphs, tables, diagrams. (F22)

265-F. Custom-Rolled Paper-Thin Metals for Aircraft. Monroe Sherman. *Aviation Age*, v. 20, Oct. 1953, p. 28-29.
Production and use of strip in thicknesses down to 0.0005 in. Photographs. (F23, T24)

266-F. Rolls and Rolling Rails. E. E. Brayshaw. *Blast Furnace and Steel Plant*, v. 41, Oct. 1953, p. 1176-1186.
Rolling of rail joint bars. Diagrams. (F23)

267-F. Aluminum Tubing. Small Diameter and Thin Walls Obtained by Extrusion. Gilbert C. Close. *Light Metal Age*, v. 11, Oct. 1953, p. 8-9, 28.
Equipment, plant layout and procedure. Photographs. (F26, Al)

268-F. Drop Forging Huge Titanium Aircraft Propellers. *Light Metal Age*, v. 11, Oct. 1953, p. 10.
Forging process and applications to aircraft industry. Photographs. (F22, Ti)

269-F. Flat-Die Forging of Cast-Titanium Ingots. J. F. Nelson. *Machinery*, v. 60, Oct. 1953, p. 164-168.
Experiences and recommendations of one company. Photographs. (F22, Ti)

270-F. Aluminum Rolling and Extrusion. *Metal Industry*, v. 83, Oct. 2, 1953, p. 275-278.
Equipment, plant layout and procedure. Photographs. (F23, F24, Al)

271-F. The Rolling of Metals and Alloys. I. Historical Development of the Rolling Mill. Eustace C. Larke. *Sheet Metal Industries*, v. 30, no. 318, Oct. 1953, p. 863-878.
History, early developments and recent advances made in flat rolling metals. Photographs, diagrams. 44 ref. (To be continued.) (F23)

272-F. New Seamless Mill Rolls Into Action. *Steel*, v. 133, Oct. 12, 1953, p. 97-99.
Plant layout and equipment. Photographs. (F26)

273-F. Evaluating Rolling Pressures in Hot and Cold Strip Mills. N. H. Polakowski. *Steel*, v. 133, Nov. 2, 1953, p. 96, 98, 100, 103-104.
Methods for prediction and direct measurement of roll separating forces under operating conditions. Tables, photographs, diagrams. 7 ref. (F23)

274-F. Hot Working Steels in the Forge and Their Treatment. W. Eilender and R. Mintrop. *Steel Processing*, v. 34, Oct. 1953, p. 509-515.
Survey of most frequently used hot forging steels and their properties. Factors which should be considered during heat treating. Table, graphs. (F22, J general, ST)

275-F. (German.) **Modern Drives and Controls in Heavy, Reversing Mill Trains and Cold-Rolling Mills.** Horst Nüsslin. *Stahl und Eisen*, v. 73, no. 18, Aug. 27, 1953, p. 1148-1155.
Improvements effected in rolling mills in recent years including motors used, twin drives, ground connection controls and centrifugal couplings. Photographs, graphs, diagrams. 4 ref. (F23)

276-F. (German.) **Electronic and Magnetic Control Methods for Continuous and Reversible Hot-Rolling Mills.** Gustav Lemcke. *Stahl und Eisen*, v. 73, no. 18, Aug. 27, 1953, p. 1156-1162.
Methods of control of stand drives. Electronic time-lag relays for auxiliary drives. Diagrams, graphs, photographs. 11 ref. (F23)

277-F. (Hungarian.) **High-Strength Wrought Aluminum Alloys Without Nickel.** *Aluminium (Budapest)*, v. 5, no. 5, May 1953, p. 97-103.
Investigations on the forging technology of Al-Mg-Si-Cu and Al-Mg-Zn-type alloys. Diagrams, graphs, micrographs. 14 ref. (F22, Al)

278-F. Mechanical Design and Operation of a Modern 46-In. High Lift Slabbing-Blooming Mill. J. H. Mayer. *Iron and Steel Engineer*, v. 30, Oct. 1953, p. 55-59; disc., p. 59-60.
Equipment, plant layout and operating procedures. Photographs, diagram. (F23, ST)

279-F. Electrical Design and Operation of a Modern 46-In. High Lift Slabbing-Blooming Mill. George A. Kaufman and Andrew W. Smith. *Iron and Steel Engineer*, v. 30, Oct. 1953, p. 61-66; disc., p. 66-68.
Equipment and plant layout. Photographs, diagrams, oscillograms. (F23, ST)

280-F. From Smelted Aluminum to Finished Sash With Presses. Walter Rudolph. *Modern Industrial Press*, v. 15, Oct. 1953, p. 36, 38, 40, 42.
Extrusion equipment, plant layout and operating procedure. Photographs. (F24, Al)

281-F. (German.) **Determining the Impact Energy of Forge Hammers.** *Metall*, v. 7, nos. 17-18, Sept. 1953, p. 693-694.
Influence of preparation, treatment and size of sample. Graphs, photographs. 2 ref. (F22, Pb)

282-F. (German.) **The Formation of Surface Defects in the Hot-Working of Steel Due to Copper and Tin Impurities.** Kurt Born. *Stahl und Eisen*, v. 73, no. 20, Sept. 24, 1953, p. 1268-1277; disc., p. 1277-1280.
High-temperature bending tests reveal surface cracking between 950 and 1150° C. Photographs, micrographs, graphs, tables. 14 ref. (F general, AY, Cu, Ni, Sn)

283-F. (Polish.) **Comparison of Calculation Methods for Roll Pressure in Cold Rolling of Strip.** K. Filasiewicz, Z. Wusatowski, and A. Galanty. *Prace Instytutow Hutnictwa*, v. 5, no. 2, 1953, p. 57-81.
Critical considerations of theoretical formulae and practical methods. Tables, graphs. 21 ref. (F23)

284-F. (Book—German.) **(Rolled Cast Iron.) Gewalztes Gusseisen.** Eugen Piwowarsky and Adalbert Wittmoser. 1949. 132 p. Verlag W. Girardet, Essen, Germany. 12.80 DM.
Hot and cold forming of cast iron. Effects of alloying metals. Photographs, drawings, tables. (F general, G general, CI)

G

Secondary Mechanical Working

366-G. Automatic Stamping and Welding of Sheet Metal Parts. *Automotive Industries,* v. 109, Oct. 1, 1953, p. 48-49.
Equipment. Photographs.
(G3, K general)

367-G. 40,000 Flame Cutting Machines Speed Metal Fabrication. *Industry & Welding,* v. 26, Oct. 1953, p. 74-76, 79, 138-139.
Wide variety of oxy-acetylene cutting operations. Photographs. (G22)

368-G. Machining Nickel Alloy Steels. G. P. Witteman. *Machine and Tool Blue Book,* v. 49, Oct. 1953, p. 164-170, 172-174, 176, 178, 180, 185-186, 188, 190.
Machinability in respect to hardness and microstructure. Micrographs, tables, diagrams, photograph. (G17, AY)

369-G. Kneading Die Produces Steel Type Rapidly. Herbert Chase. *Machine and Tool Blue Book,* v. 49, Oct. 1953, p. 194-195, 198.
Design and operating characteristics of die for making electric typewriter type. Photographs. (G3)

370-G. New Trimmer Saves Operation, Lowers Tooling Costs. Paul Anstedt. *Machine and Tool Blue Book,* v. 49, Oct. 1953, p. 203-205.
Design and operating characteristics. Photographs. (G15)

371-G. Light Machining Operations on Die Castings. H. K. Barton. *Machinery (London),* v. 83, Sept. 25, 1953, p. 631-638.
Flash removal, dimensional accuracy and special features. Diagrams. (G17, E13)

372-G. A Large Boring Mill With Special Features. *Machinery (London),* v. 83, Oct. 2, 1953, p. 682-689.
Plant layout, equipment and procedure. Photographs, diagrams. (G17)

373-G. Where Shot Peening Can Be Used to Advantage. John L. Everhart. *Materials & Methods,* v. 38, Oct. 1953, p. 110-113.
Applications in straightening and forming, decreasing stress-corrosion cracking, reducing porosity in castings and testing quality of plating. Photographs, graph, table. (G23)

374-G. Spun Metal Shapes Meet Tough Requirements. Herbert Edlund. *Materials & Methods,* v. 38, Oct. 1953, p. 134-136.
Spinnings are finding increased use where limited numbers of large parts are required. Photographs. (G13)

375-G. Impact Extrusion Research. *PERA Bulletin,* v. 6, Sept. 1953, p. 506-512.
Describes process and applications. Diagrams. 48 ref. (G5)

376-G. (French.) **Machinability of Stainless Steel.** Jean Daurat. *Métallurgie, et la construction méchanique,* v. 85, no. 8, Aug. 1953, p. 619-621.
Milling procedures. (To be continued.) (G17, SS)

377-G. (German.) **"ESA", A New Electric Arc-Oxygen Cutting Process.** E. Brünn and F. Erdmann-Jesnitzer *Schweisstechnik,* v. 7, no. 6, June 1953, p. 68-70.
Principle, procedure and equipment; shows process is superior and more economical than other cutting methods. Photographs. (G22)

378-G. (German.) **Systematic Machining Processes.** Walter Schmidt. *VDI Zeitschrift des Vereines deutscher Ingenieure,* v. 95, no. 20, July 11, 1953, p. 689-695.
Theoretical concepts of processes of shaping by cutting. Diagrams. 5 ref. (G17)

379-G. Working With Titanium. Norman S. Currey. *Aviation Age,* v. 20, Oct. 1953, p. 134-139.
Technical and financial aspects of forming, welding and machining. Tables, photographs.
(G general, K general, Ti)

380-G. Radial Forming Aluminum. *Modern Metals,* v. 9, Oct. 1953, p. 46.
New expansion forming technique which produces fewer defects than hammer deformation or spinning. Method is also used on stainless steel. Photograph. (G9, Al, SS)

381-G. The Forming of Aluminum Sheet. I. The Characteristics of the Metal. H. Hinxman. *Sheet Metal Industries,* v. 30, no. 318, Oct. 1953, p. 847-850, 878.
Fundamental concepts of usage of Al and Al alloy sheet. Table, photograph. (To be continued.)
(G general, Al)

382-G. New Forming Process. Thomas A. Dickinson. *Sheet Metal Industries,* v. 30, no. 318, Oct. 1953, p. 899-901, 906.
Rubber pad process which minimizes tooling costs and destructive sound vibrations. Photographs, diagram. (G8)

383-G. Impact Extrusion of Magnesium. *Steel,* v. 133, Oct. 26, 1953, p. 114-116.
Metal flows at 350 to 500° F. and at about half the pressure needed for aluminum. Reports light weight products resist corrosion and have good electrical and heat conductivity. Photographs, diagram, graph. (G5, Mg)

384-G. Needle Tube Production. *Steel,* v. 133, Nov. 2, 1953, p. 90-91.
Procedure demanding sharp tolerances and appropriate heat treatment. Photographs. (G general)

385-G. Smooth Out Your Disc Grinding Problems. J. Karl McLaughlin. *Steel,* v. 133, Nov. 2, 1953, p. 92-94.
Greater efficiency from abrasive disks by eliminating five common grinding errors. Photographs. (G18)

386-G. Magnesium Forming. I. General Considerations. Francis L. Coenen. *Tool Engineer,* v. 31, Nov. 1953, p. 43-49.
General rules, based on production data, that may serve as guides in planning processes and equipment. Photographs, tables, graphs, diagrams. (To be continued.)
(G general, Mg)

387-G. Mechanics of Tool Engineering. II. Hole Engineering. Andrew E. Rylander. *Western Machinery and Steel World,* v. 44, Oct. 1953, p. 85-90.
Precision drilling, reaming and grinding. Diagrams, photographs. (G17, G18)

388-G. Tube Forming Techniques Pay Off Big Dividends at Ryan. William P. Brotherton. *Western Machinery and Steel World,* v. 44, Oct. 1953, p. 96-97.
Unusual techniques of forming odd-shaped sections from tubing has reduced costs and increased production. Photographs. (G6)

389-G. (Greman-French.) **The Effect of Impurities in Free-Machining Brass.** *Pro-Metal,* v. 6e, no. 34, Aug. 1953, p. 211-213.
Experiments show that up to 0.35% iron or 0.2% aluminum do not reduce machinability of brass or life of the cutting tool. Diagrams, table, graph.
(G17, Al, Fe, Cu)

390-G. (German.) **Influence of Silicon in Aluminum on Longevity of Cutting Tools.** H. Lindqvist. *Aluminium,* v. 29, no. 9, Sept. 1953, p. 375-377.
Data from machining aluminum alloys containing silicon. Graphs, diagram. (G17, Al, Si)

391-G. (German.) **Increasing Output by Cold Pressing Light Metals.** H. Hornauer. *Aluminium,* v. 29, no. 10, Oct. 1953, p. 405-413.
Shows that work hardening can be avoided. Greater economy of tools and materials and lowered assembly costs realized by dispensing with the annealing operation. Diagrams, graphs, photographs, tables, micrographs. 12 ref.
(G1, Al, Mg, Cu, Si)

392-G. (German.) **Cold Extrusion Molding.** F. Mass. *Metall,* v. 7, nos. 17-18, Sept. 1953, p. 689-692.
Basic processes, choice of materials, preparatory procedures and molding. Diagrams, graph.
(G5, Al, Zn, Cu, ST)

393-G. (German.) **Influence of Certain Impurities on Machining Brass Stock.** K. Schimz. *Metall,* v. 7, nos. 17-18, Sept. 1953, p. 700-701.
Influence of iron and aluminum. Tables. Ref. (G17, Al, Cu, Fe)

394-G. (German.) **Grinding Agents for Hard-Metal Tools.** *Metall,* v. 7, nos. 17-18, Sept. 1953, p. 701-703.
Use of diamonds as abrasives. Table. (G18)

395-G. (German.) **Relationship Between Machinability and Other Properties of Materials.** Franz Rapatz. *Stahl und Eisen,* v. 73, no. 18, Aug. 27, 1953, p. 1169-1174.
Development and forms of wear and means of influencing it. Chip shapes, faster cutting speeds, embrittlement, increased material strength and reduced friction coefficients considered. Photographs, graphs. 15 ref. (G17, ST)

396-G. (German.) **Stamping of Rolled Material in Hot Saws, Hot Shears, and Dressing Machines.** Herbert Zimmer. *Stahl und Eisen,* v. 73, no. 18, Aug. 27, 1953, p. 1174-1176.
Significance of stamping methods and how they are carried out. Photographs, diagrams. (G3)

397-G. (Russian.) **Anodic-Mechanical Grinding of Circular Cutting Tools With Tips of Hard Alloys.** G. P. Slesarchuk. *Stanki i Instrument,* v. 24, no. 4, Apr. 1953, p. 20-21.
Method results in absence of cracks in tips, cleaner working surfaces and higher productivity. Diagrams. (G18, TS)

398-G. (Russian.) **Redesign of Metal Cutting Machines for Anodic-Mechanical Work.** G. A. Karasik. *Stanki i Instrument,* v. 24, no. 6, June 1953, p. 9-17.
Changes necessary on lathes and milling machines. Diagrams, tables, photographs. (G17)

399-G. (Russian.) **Turning of Parts Built-Up With "Sormaite".** E. A. Belousova and A. Ia. Malkin. *Stanki i Instrument,* v. 24, no. 5, May 1953, p. 10-13.
Composition and mechanical properties of a 13-25% Cr-Fe alloy used to build up wear resistant surfaces. Techniques of machining built-up parts are presented. Tables, diagrams. (G17, L24, Q9, Cr, Fe)

400-G. Cope Talks on Draw Dies. VI. When You Redraw Shells Observe Certain Rules. Stanley R. Cope. *American Machinist,* v. 97, Oct. 26, 1953, p. 120-123.
Three general classes of redrawing dies and choice of correct tools. Diagrams. (To be continued.) (G4)

401-G. A Handbook of Workholding Devices. I. Rotating Devices. H. E. Linsley. *American Machinist,* v. 97, Oct. 26, 1953, p. 129-144.

Some conventional and unusual examples and typical applications. Photographs, diagrams. (G17)

402-G. Spinning vs Drawing. II. J. Lenbridge. *Canadian Metals,* v. 16, Oct. 1953, p. 48, 50.

Evaluation of the above, which can compete with or supplement each other according to economics involved in individual cases. Table. (G13, G4)

403-G. Lubrication in Metal Cutting. *Canadian Metals,* v. 16, Oct. 1953, p. 62, 64.

Evaluation of part played by cutting fluids in machining operations and some causes of tool failure. Graphs, table. (G21)

404-G. The Grinding of Steel. XII. Grinding Twist Drills, Counterbores, Cutters, and Reamers. *Edgar Allen News,* v. 32, Oct. 1953, p. 229-230.

Sharpening of 18 metalcutting tools. Diagrams. (To be continued.) (G18)

405-G. Electric Spark Erosion as Applied to Metal Machining. D. W. Rudorff. *Engineers' Digest,* v. 14, Oct. 1953, p. 373-377.

Equipment, principles and techniques of the "Sparcatron" process. Photographs, diagrams. (G17)

406-G. Application of External Dust Control to a Standard 24-In. Pedestal Grinder. I. Dust Control System. W. H. White. **II. Dust Observations and Determinations,** W. B. Lawrie, *Foundry Trade Journal,* v. 95, Oct. 15, 1953, p. 481-487.

Work which led to the above, including observations of the loci of dust clouds. Series of dust counts as indication of efficiency of system. Photographs, diagrams, tables. 2 ref. (G18, A5)

407-G. How Do Boron Steels Compare in Machinability? Norman Zlatin, J. F. Kahles, and W. H. Friedlander. *Iron Age,* v. 172, Oct. 29, 1953, p. 94-97.

Tests comparing machining characteristics with equivalent standard alloy steels. Graphs, tables. (G17, AY)

408-G. Calculations on Sheet-Drawing Under Back Tension Through a Rough Wedge-Shaped Die. J. F. W. Bishop. *Journal of the Mechanics and Physics of Solids,* v. 2, Oct. 1953, p. 39-42.

Based on the Hill-Tupper theory, a single empirical formula expressing drawing stress as a function of die semi-angle, coefficient of friction, reduction and back-tension, is derived. Graphs. 5 ref. (G4)

409-G. Applications of Unit-Type Automatic Transfer Machines. *Machinery (London),* v. 83, Oct. 9, 1953, p. 699-711.

Equipment, plant layout and procedures. Photographs, diagrams. (To be continued.) (G17)

410-G. The Design of Follow-On Tools for Chappuis Automatic Presses. Jacques A. Chappuis. *Machinery (London),* v. 83, Oct. 9, 1953, p. 712-716.

Use of a single machine to produce several press operations. Photograph, diagrams. (G1)

411-G. Lubrication in the Cutting of Metals. Antoni Niedzwiedzki, *Machinery (London),* v. 83, Oct. 9, 1953, p. 717-721, 741.

Functions and properties of lubricants. Effects of friction when cutting metals. Diagrams, photograph. 19 ref. (G21)

412-G. Continental Developments in High-Speed Hobbing. *Machinery (London),* v. 83, Oct. 9, 1953, p. 733-735.

Advantages of improved hob life and outstanding production savings. Photographs. (G17)

413-G. Greater Structural Efficiency for U. S. Airpower Provided by Larger Aluminum Extrusions. George E. Moni. *Western Metals,* v. 11, Oct. 1953, p. 58-60.

Design and operation of two new presses and their advantages over "bits and pieces" fabrication. Photographs, diagram. (G5, F24, Al)

414-G. Military Tank Torsion Bars Shot Peened for Fatigue Resistance. Edgar Brooker. *Western Metals,* v. 11, Oct. 1953, p. 61-63.

Equipment, techniques and benefits of process. Photographs. (G23)

415-G. Machining Costs of Iron Castings Cut With Cupola Deoxidation Process. *Western Metals,* v. 11, Oct. 1953, p. 66-68.

Technique, requirements of good deoxidizer and effects of processing on microstructure. Photographs, graphs. (G17, E10, CI)

416-G. (French-German.) **The Hot Pressing of Copper Alloys.** *Pro-Metal,* v. 6e, no. 34, Aug. 1953, p. 203-210.

Materials, dies, die design and advantages of hot pressing methods. Diagrams, photographs. (G1, Cu)

417-G. (French.) **Shot Peening in the Steelmaking Industry.** Guy Giudicelli. *Métallurgie et la construction mécanique,* v. 85, no. 9, Sept. 1953, p. 723-729.

Difference between shot peening and descaling. Machinery and methods for shot peening and its specialized application. Photographs. (G23, L10, ST)

418-G. (German.) **Damage by Grinding and Polishing Materials.** Walter Burkart. *Metalloberfläche,* Ausgabe B, v. 5, no. 9, Sept. 1953, p. 137-138.

Behavior of quartz, natural corundum, tripoli earth, iron oxide, chromium oxide and clay. 2 ref. (G18, L10)

419-G. (Russian.) **Selection of Punch Tip Radius for Free Bending.** I. P. Renne. *Vestnik Mashinostroeniia,* v. 33, no. 5, May 1953, p. 35-41.

Effect of tip radius on radius of curvature of articles formed from various materials. Diagrams, graphs, table. 3 ref. (G6)

H
Powder Metallurgy

121-H. The Toy Industry. Why it Uses Powdered Metal Parts by the Million. *Precision Metal Molding,* v. 11, Oct. 1953, p. 46-48, 120.

Applications of powder metallurgy in manufacturing low-cost parts. Photographs, table. (H general)

122-H. Are High Density Parts Practical by Powder Metallurgy? *Precision Metal Molding,* v. 11, Oct. 1953, p. 50-51.

Three examples of high-density parts being made by powder metallurgy at lower costs than when made by other fabricating processes. Photographs. (H general, Fe)

123-H. The Sintering Process. I. Theory. Philip R. Kalischer. *Precision Metal Molding,* v. 11, Oct. 1953, p. 58-59, 109-115.

Possible mechanisms involved. (To be continued.) Diagrams. (H15)

124-H. (German.) **Production of Alloys by Impregnation.** Heinz Anders. *Werkstoffe und Korrosion,* v. 4, nos. 8/9, Aug./Sept. 1953, p. 308-309.

Progress in powder metallurgy in Germany and abroad. 3 ref. (H16, Cu, Zn, Ag)

125-H. (Hungarian.) **Development of Aluminum Powder Metallurgy.** György Halmos. *Aluminium, (Budapest),* v. 5, no. 6, June 1953, p. 130-133; no. 7, July, 1953, p. 159-162.

Experiments with Al alloy, Al-Cu bimetallic, Al-metalloid and Al sintered bodies. Machinery used and strength values achieved. Tables, charts, diagrams, photographs. (To be continued.) (H general, Al)

126-H. Effective Thermal Conductivities of Magnesium Oxide, Stainless Steel, and Uranium Oxide Powders in Various Gases. C. S. Eian and R. G. Deissler. *U. S. National Advisory Committee for Aeronautics, Research Memorandum* E53G03, Oct. 29, 1953, 18 p.

Tests were conducted at temperatures between 120 and 1455° F. Fair agreement was obtained between conductivities calculated from experimental data and those calculated from a simplified analysis. Effect of gas pressure on effective thermal conductivity. Graphs, micrographs. (H11, P11, SS)

J
Heat Treatment

226-J. Nitriding of Titanium With Ammonia. James L. Wyatt and Nicholas J. Grant. *American Society for Metals, Preprint no.* 3, 1953, 26 p.

Surface hardening techniques applicable to Ti made to decrease wear and eliminate galling and seizing in commercial material and in Ti alloys. Diagram, graphs, micrographs. 7 ref. (J28, Ti)

227-J. Heat Treatment of High Strength, Titanium-Base Alloys. W. M. Parris, P. D. Frost, and J. H. Jackson. *American Society for Metals, Preprint no.* 4, 1953, 19 p.

Properties of heat treated Ti alloys were found to depend upon composition, type of heat treatment and fabrication history. Table, graphs, micrographs. 9 ref. (J general, Q general, Ti)

228-J. The Carbo-Nitriding of Boron Steels. G. W. Powell, M. B. Bever, and C. F. Floe. *American Society for Metals, Preprint no.* 23, 1953, 13 p.

Effect of B on hardenability. Tables, graphs, micrographs. 14 ref. (J28, CN, AY)

229-J. The Effect of Silicon on the Kinetics of Tempering. Walter S. Owen. *American Society for Metals, Preprint no.* 24, 1953, 17 p.

Effects of three stages of tempering were separated and analyzed by means of the precision length measurement technique. Tables, graphs, micrographs. 15 ref. (J29, AY)

230-J. Another Look at Quenchants, Cooling Rates and Hardenability. D. J. Carney. *American Society for Metals, Preprint no.* 5W, 1953, 43 p.

Correlation of cooling rates and hardness in rounds and end-quench bars of low-alloy steels. Tables, graphs, micrographs. 14 ref. (J26, J2, AY)

231-J. Thermal Reproducibility of the End-Quench Test. John Birtalan, R. G. Henley, Jr., and A. L. Christenson. *American Society for Metals, Preprint no.* 6W, 1953, 20 p.

Effects of water pressure, temperature, bar scale condition and transfer time from furnace to quenching fixture. Graphs, photographs. (J26, CN)

232-J. Analysis of Hardenability Under Marquenching Conditions. Carl M. Carman, Dominick F. Armiento, and Harold Markus. *American Society for Metals, Preprint no.* 7W, 1953, 21 p.

Development of a Jominy-type hardenability test using molten salt

at 400° F. as quenching medium. Hardenability of 11 commercial heat treatable steels determined. Tables, graphs, micrographs, diagrams. 11 ref. (J26, ST)

233-J. Heat Treatment of Tool Steels. J. G. Ritchie. *Australasian Engineer,* 1953, Feb., p. 73-80; disc., p. 80-81.

Metallurgical principles, water and oil hardening series, high speed hot work series, annealing and tempering. Tables, graphs. 4 ref. (J general, TS)

234-J. The Influence of Gaseous Atmospheres Containing Hydrogen on the Annealing of Malleable Cast Iron. S. W. Palmer. *British Cast Iron Research Association. Journal of Research and Development,* v. 5, Aug. 1953, p. 26-37.

Influence of H_2 on rate of heating and graphitization of blackheart malleable. Micrographs, graphs, tables. (J23, CI)

235-J. Second-Stage Malleablization. Floyd Brown. *Foundry,* v. 81, Oct. 1953, p. 108-109, 203, 205-207.

Direct and indirect transformation mechanism in determining most economical conditions for 2nd stage malleablization. Diagrams, tables. 3 ref. (J23, CI)

236-J. Heat-Treatment of Metal and Its Fire Hazards. R. W. Oxenbury. *Foundry Trade Journal,* v. 95, Sept. 24, 1953, p. 399-400.

Fire and explosion hazards of quenching tanks, oil storage, and salt baths. (J2, A7)

237-J. Induction Heating Generators as Production Tools in Heat Treating Operations. Peter A. Hassell. *Institute of Radio Engineers, Transactions, Professional Group on Industrial Electronics,* PGIE-1, Aug. 1953, p. 11-15.

Principles and development of equipment, typical installations and applications. Photographs, diagrams. (J2)

238-J. Stainless Steel Wire. J. Lomas. *Machinery Lloyd (Overseas Ed.),* v. 25, Sept. 26, 1953, p. 82-83.

Softening treatment, high temperature annealing, and avoiding brittleness. (J29, J23, SS)

239-J. Surface Hardening of Steels and Irons. John L. Everhart. *Materials & Methods,* v. 38, Oct. 1953, p. 137-152.

Carburizing, nitriding, cyaniding and carbonitriding, and flame and induction hardening. Photographs, tables. (J28, J2, Fe)

240-J. Batch Heat Treating Is Versatile. Frank Crahen. *Steel,* v. 133, Sept. 28, 1953, p. 86-87.

Equipment and handling techniques. Photographs, table. (J general, CN)

241-J. (Dutch.) **Controlled Atmosphere for Steel With Adjustable Carbon Potential.** J. W. Holleman, W. A. Schultze, and M. A. DeJongh. *Metalen,* v. 8, no. 13, July 15, 1953, p. 263-266.

Methods for generating atmospheres with emphasis on quick adjustment of the C content of the protecting gas. Outline of an installation of simple construction. Diagrams, tables. (J2, ST)

242-J. How to Stop Pipe Weld Failure. *Chemical Engineering,* v. 60, Nov. 1953, p. 214.

Use of induction heating to stop stress failure of alloy and stainless steel pipe welds. (J2)

243-J. Automatic Gas Equipment is the Keynote for This Modern Heat Treating Plant. S. Clifton Pruett. *Industrial Gas,* v. 32, Oct. 1953, p. 3-6.

Equipment, plant layout and procedures including martempering, austempering, annealing, hardening, carburizing and normalizing. (J general)

244-J. Low Temperature Stress Relieving of Mild Steel Welded Structures. L. E. Benson and S. J. Watson. *Institute of Welding, Transactions,* v. 16, Aug. 1953, p. 90-95.

Experiments designed so that a quantitative estimate could be made of efficiency of stress relieving treatments at temperatures below 600° C., and particularly in region of 200-300° C. Tables, graphs, photographs, diagrams. 4 ref. (J1, ST)

245-J. Cast Refractories Lower Heat Treat Furnace Costs. T. F. Keegan. *Iron Age,* v. 172, Oct. 22, 1953, p. 113-115.

Advantages of cast refractories over conventional types after eight months operating experience at Lansing Drop Forge Co. Photographs. (J general)

246-J. Hot Face Insulation. *Iron & Steel,* v. 26, Oct. 1953, p. 468-470.

Operating advantages of its use in large annealing furnaces. Tables, diagrams. (J23)

247-J. The Bright Annealing of Copper and Its Alloys. W. C. F. Hessenberg and E. C. Mantle. *Metal Industry,* v. 83, Oct. 2, 1953, p. 279-281.

Oxygen-free atmospheres used in heat treating copper to reduce or eliminate oxide scaling. Diagrams, photographs. 6 ref. (To be continued) (J23, Cu)

248-J. Short Cycle Hardening of Tool Steels. J. Y. Riedel. *Metal Treating,* v. 4, Sept.-Oct. 1953, p. 2-3, 26.

Process of high speed steel hardening heat treatment operations, involving heating to unusually high temperatures for a short time. Includes hardness data, tables and photographs. (J26, TS)

249-J. Flame Hardening and Its Application to Meehanite Metal With an Improved Torch Design. Ron Ekins. *Metal Treating,* v. 4, Sept.-Oct. p. 4-5.

Conventional and new improved orifices in tips for flame-hardening equipment. (J2, CI)

250-J. Pusher Type Furnaces. E. W. Weaver. *Metal Treating,* v. 4, Sept.-Oct. 1953, p. 6-8.

Equipment, methods of work loading and advantages of pusher design. Photographs. (J general)

251-J. Roller Hearth Furnaces. C. O. Knierim. *Metal Treating,* v. 4, Sept.-Oct. 1953, p. 9-10.

Recent developments, general design and applications. Photographs. (J general)

252-J. The Problems of Furnace Control. II. Leo Walter. *Steel Processing,* v. 34, Oct. 1953, p. 521-525.

Automatic controls for heat treating furnaces. Diagrams. (J general, S16)

253-J. (French.) **Nitriding of Certain Nickel-Cobalt Alloys Near Their Curie Point.** Georges Nury. *Comptes rendus,* v. 237, no. 13, Sept. 28, 1953, p. 654-656.

Experiments were made between 300 and 600° C. on alloys containing 8, 9, 10 and 12% cobalt. Hardness-temperature curves plotted. Graphs. (J28, Ni, Co)

254-J. (German.) **Prospects of Oxy-Acetylene Low-Temperature Stress Relieving of Welds of Boilers and Pressure Vessels.** W. Mielentz. *Schweissen und Schneiden,* v. 5, no. 7, July, 1953, p. 268-269.

Three methods of treatment, evaluated technologically, metallurgically, and economically. 7 ref. (J1)

255-J. (German.) **Industrial Quenching of Basic Converter Steel From Rolling Heat.** Franz Kösters. *Stahl und Eisen,* v. 73, no. 21, Oct. 1953, p. 1342-1348.

Design and operation of a device for hardening round and structural steel up to 12 m. long. Effect on mechanical properties. Tables, diagrams, graphs. 12 ref. (J26, Q general, AY)

256-J. (Russian.) **Welding of Chromium Steels.** L. E. Fedotov. *Avtogennoe Delo,* v. 24, no. 6, June 1953, p. 21.

Annealing of welded seams. 8 ref. (J23, K general, AY)

257-J. (Russian.) **Electric Hardening of Tool Bits.** L. Ia. Popilov. *Stanki i Instrument,* v. 24, no. 5, May 1953, p. 17-19.

Apparatus and process. Results of processing carbon and high speed steel tools. Tables. (J26, TS)

258-J. Oxy-Acetylene Flame Hardening. *Canadian Metals,* v. 16, Oct. 1953, p. 40, 42, 44.

Process which consists essentially of raising metal locally above its transition temperature and quenching rapidly. Photographs, diagram, graph. (J2)

259-J. Electric Annealing of White Iron. Richard W. Parsons. *Foundry,* v. 81, Nov. 1953, p. 112-115.

Improved annealing techniques for cast iron, resulting in superior mechanical properties. Graphs, photographs. (J23, Q general, CI)

260-J. Heat Treatment of Steel Castings. II. John Howe Hall. *Foundry,* v. 81, Nov. 1953, p. 124-127, 242, 244, 246, 248.

Effects of ferrite and pearlite on cast steels containing 0.18 to 0.20% carbon and effects of time-temperature relationships on structure and properties. Photographs, diagrams, graphs. 2 ref. (To be concluded.) (J general, CI)

261-J. Heat Treating Facilities Provide Versatility, Rigid Control. W. G. Patton. *Iron Age,* v. 172, Oct. 29, 1953, p. 106-108.

Equipment and techniques adaptable to variety of parts and processes. Photographs. (J general)

262-J. High Speed Continuous Annealing of Tinplate. M. D. Stone and E. A. Randich. *Iron and Steel Engineer,* v. 30, Oct. 1953, p. 69-75; disc., p. 75-78.

Plant layout, equipment and operating procedures. Diagram, photographs. 7 ref. (J23, Sn, ST)

263-J. The Bright Annealing of Copper and Its Alloys. W. C. F. Hessenberg and E. C. Mantle. *Metal Industry,* v. 83, Oct. 9, 1953, p. 301-303.

Use of various artificial atmospheres. Photographs. 7 ref. (To be continued.) (J23, Cu)

264-J. Flame Hardening Machines Speed Treatment of Engine Components. Arthur H. Allen. *Metal Progress,* v. 64, Oct. 1953, p. 97-102.

Mechanization of flame hardening process has resulted in accurate control, efficiency and ease of equipment maintenance. Photographs. (J2)

265-J. A Signaller to Reduce Quench Cracking of Steel. L. D. Jaffe, D. C. Buffum, and I. L. Preble. *Metal Progress,* v. 64, Oct. 1953, p. 119-121.

Design and use. Photographs, diagram, tables. (J26, AY)

266-J. Water in Molten Salt Increases Quenching Power, Lowers Operating Temperature. E. N. Case and A. M. White. *Metal Progress,* v. 64, Oct. 1953, p. 122-124.

Characteristics of KNO_3, $NaNO_3$, $NaNO_2$, H_2O system and possible applications. (J2)

267-J. Surface Treatment of Titanium. *Steel,* v. 133, Nov. 2, 1953, p. 130-132.

Summary of symposium sponsored by Watertown Arsenal at Armour Research Foundation. Hard surfaces produced by nitriding, carburizing, carbonitriding and induction heating. Silicon coating affords protec-

tion against oxidation. Photographs, graphs, table, diagrams. (J28, J2, L15, Si, Ti)

268-J. (Russian.) **Application of an Air Cooling Machine for Metal Tempering.** L. Rozenfel'd and N. Koshkin. *Kholodil'naia Tekhnika,* 1953, no. 2, Apr.-June, p. 15-19.

Obtaining of temperatures down to −110° C. Table, graphs, photograph, diagram. (J29)

269-J. (Russian.) **Phase Stresses Arising During Cementation of High-Carbon Steel.** V. V. Abramov. *Vestnik Mashinostroeniia,* v. 33, no. 6, June 1953, p. 70-71.

Shows that carburizing does not lead to additional deformations. Diagrams, graphs. (J28, CN)

270-J. (Swedish.) **Cementite Formation in Mild Steel and Sponge Iron on Gas Carburizing.** T. Norén and U. Landergren. *Jernkontorets Annaler,* v. 137, no. 7, 1953, p. 209-216.

Formation at temperatures below A_1. Table, graph. 20 ref. (J28, CN, Fe)

271-J. (Swedish.) **Conditions for the Formation of Cementite During the Carburization of Nickel Steels.** A. Hultgren and M. Hillert. *Jernkontorets Annaler,* v. 137, no. 7, 1953, p. 217-223.

Cementite formation decreases with increased nickel content. Graph, micrographs. 4 ref. (J28, Ni, AY)

272-J. (Book.) **Elements of Heat Treatment.** George M. Enos and William E. Fontaine. 286 p. 1953. John Wiley & Sons, 440 Fourth Ave., New York 16, N. Y. $5.00.

An introduction to the subject showing how mechanical properties of metals and alloys may be altered to suit particular situations. Discusses annealing, hardening, tempering, and normalizing from the standpoint of specific jobs requiring given characteristics in metal. (J general)

273-J. (Book.) **Protective Atmospheres.** A. G. Hotchkiss and H. M. Webber. 1953. 341 p. John Wiley & Sons, Inc., 440 Fourth Ave., New York 16, N. Y. $7.00.

Survey of properties, applications, generation methods, and results of atmospheric gases. Includes a discussion of basic chemical reactions of gases used for furnace atmospheres, preventing or reducing oxides, preventing decarburization, carburizing, carbon restoration and nitriding, and instruments for analyzing, controlling, and measuring gases. (J2)

274-J. (Book—German.) **(The Hardenability of Steel.) Die Härtbarkeit des Stahls.** Heinrich Arend and Werner Neuhaus. 200 p. Verlag W. Girardet, Essen, Germany. 19.80 DM.

History and problems, physics of iron alloys, and transformation processes. Cites experimental data and results. Photographs, diagrams, tables. (J26)

K

Joining

638-K. The Fabrication of Copper Vessels. J. B. Carroll. *Australasian Engineer,* 1953, Feb. p. 56-57.

Procedures for welding Cu sheet. Diagrams. (K general, Cu)

639-K. Multitransformer Welding Presses. Jack Ogden. *Electrical Engineering,* v. 72, Oct. 1953, p. 919-924.

Advantages of press welding in high-production applications. Equipment and methods. Diagrams, graphs. (K5)

640-K. How to Set Up Welding Procedures to Minimize Distortion. E. R. Beyer. *Industry & Welding,* v. 26, Oct. 1953, p. 55-58, 61, 106-107.

Careful design of weldments eliminates distortion caused by "overwelding". Photographs. (K general)

641-K. Where to Use Brazing Alloy Preforms. H. H. Olson. *Industry & Welding,* v. 26, Oct. 1953, p. 82-84, 86, 150-152.

Photographs, diagram. (K8)

642-K. Facts About Low Hydrogen Electrodes. Richard K. Lee and J. O. Cavanagh. *Industry & Welding,* v. 26, Oct. 1953, p. 90-92, 95-99.

History, effects of slag and H_2, welding procedures and applications. Photographs, diagrams. (K1)

643-K. Chamfering and Grooving Electrode Speeds Preparation for Welding. Wm. B. Kriewall. *Industry & Welding,* v. 26, Oct. 1953, p. 101-102, 104-105.

Special coating which creates blasting effect and removes molten metal ahead of arc, leaving bright, clean groove. Photographs. (K1)

644-K. Here's How Welding Research Pays Off at Allis-Chalmers. *Industry & Welding,* v. 26, Oct. 1953, p. 109-110, 112-113.

Welding equipment of all types available in Allis-Chalmers welding laboratory to duplicate and check welding procedures used in production and maintenance. Photographs. (K general)

645-K. Procedures for Welding the 17% Chromium Stainless Steels. *Metal-Working,* v. 9, Oct. 1953, p. 20-21.

Preheating and filler metals for welding, properties of welds, and applications and advantages of various types of welding. Tables. (K general, SS)

646-K. Correct Welding Procedure. IV. Lester F. Spencer. *Sheet Metal Worker,* v. 44, Sept. 1953, p. 87-89.

Welding of steel coated with Sn, terne, Cr, Ni or Cd. Tables. (To be continued.) (K general, CN, Sn, Pb, Cr, Ni, Cd)

647-K. Argon-Arc Welding of Copper and Copper Alloys. Edwin Davis and E. A. Taylor. *Welding and Metal Fabrication* v. 21, Oct. 1953, p. 370-376.

Equipment, materials and techniques. Micrographs, tables. 7 ref. (To be continued.) (K1, Cu)

648-K. Self-Adjusting Arc Welding of Aluminium Alloys. J. E. Tomlinson and J. G. Young. *Welding and Metal Fabrication,* v. 21, Oct. 1953, p. 377-386.

Equipment and procedure. Graphs, tables, micrographs, photographs. (K1, Al)

649-K. Controlled Spot Welding of Light Alloys for Aircraft Production. II. N. K. Gardner. *Welding and Metal Fabrication,* v. 21, Oct. 1953, p. 392-401.

Inspection techniques and design data. Graphs, tables. 8 ref. (K3, EG-a)

650-K. Thin Sheets to Thick Pipe. Not Difficult Here. Robert Thomas. *Welding Engineer,* v. 38, Oct. 1953, p. 62-63.

Filler and carbon-arc welding processes. Photographs. (K1, CN)

651-K. Good Things Come in Small Packages. *Welding Engineer,* v. 38, Oct. 1953, p. 64-65.

Submerged-arc welding of small containers. Photographs. (K1)

652-K. What Goes Into a Welding Electrode? II. D. L. Mathias. *Welding Engineer,* v. 38, Oct. 1953, p. 66-68, 70.

Physical formulation of coating composition and effect of physical factors on duties of electrode coating. Photographs, graphs. (Concluded.) (K1)

653-K. Carbide Segregation in 1¼ Cr-½ Mo Steel Pipe Welded Joints. I. A. Rohrig and H. S. Blumberg. *Welding Journal,* v. 32, Sept. 1953, p. 815-822.

Results of tests on weldability and response to postwelding heat treatments. Emphasis on carbide segregation and prevention. Tables, micrographs. (K9, AY)

654-K. Arc Welding of Ferritic and Austenitic Nodular Cast Iron. J. Sohn, W. Boam and H. Fisk. *Welding Journal,* v. 32, Sept. 1953, p. 823-833.

Studies on filler wires for jet engine assemblies. Photographs, tables, diagrams. (K1, CI)

655-K. A Comparison of Shielding Mixtures for Gas-Shielded Arc Welding. J. W. Cunningham and H. C. Cook. *Welding Journal,* v. 32, Sept. 1953, p. 834-841.

Shielding qualities of gas and effects on arc characteristics and resultant weld deposit. Photographs, graphs, diagram. (K1)

656-K. Porosity in the Welding of Carbon Steel. Glenn W. Oyler and Robert D. Stout. *Welding Journal,* v. 32, Sept. 1953, p. 454s-460s.

Effects of current density, deoxidation practice of electrodes and base metal, and addition agents to the inert-gas atmosphere, on formation of porosity in inert-gas-shielded metal-arc welds in C steel. Tables, graphs, photographs. (K1, CN)

657-K. Thermal Cycles in the Arc Welding of ½-In. Titanium Plate. E. F. Nippes, J. M. Gerken, B. W. Shaff, and E. C. Nelson. *Welding Journal,* v. 32, Sept. 1953, p. 461s-474s.

Microstructures and mechanical properties relating to optimum welding conditions. Tables, graphs. 6 ref. (K1, M27, Q general, Ti)

658-K. (French.) **Control of Spot Welding by Measuring the Welding Parameters (Current and Pressure).** L. Pelletier. *Soudure et Techniques connexes,* v. 7, nos. 7-8, July-Aug. 1953, p. 171-179.

Apparatus which registers electrode pressure and current. Diagrams, tables, photographs. (K3)

659-K. (French.) **Load Voltage in Arc Welding With Coated Electrodes; Influence on Electrical Characteristics of Welding Equipment.** M. Moneyron. *Soudure et Techniques connexes,* v. 24, nos. 7-8, July-Aug. 1953, p. 191-197.

Nature of coatings, intensity and density of current and arc length. Tables, graphs. (K1)

660-K. (German.) **Influence of Electrode Coatings on Formation of Fish Eyes in Unalloyed Steel Weld Deposits and the Origin of Such Defects.** Friedrich Erdmann-Jesnitzer and Hans Kowalkowski. *Archiv für das Eisenhüttenwesen,* v. 24, nos. 7-8, July-Aug. 1953, p. 361-368.

Wood powder and kaolin as H_2 formers. Fish eye formation and elimination by changing electrode coatings. Micrographs, diagrams, tables. 16 ref. (K1, ST)

661-K. (German.) **Assumptions and Directions for Deep-Penetration Welding.** Herbert Neumann. *Schweissen und Schneiden,* v. 5, no. 8, Aug. 1953, p. 297-305.

Welding machines and applications. Photographs, graphs, tables, diagrams. 4 ref. (K6)

662-K. (German.) **Automatic Welding With "Fusarc" Electrodes.** Camille De Rop and Hans Schmide-Bach. *Schweissen und Schneiden,* v. 5, no. 8, Aug. 1953, p. 315-318.

Built-up electrode consisting of core, coating and spiral wire netting to improve electric conductivity. Design, types and uses in boiler shops and structural and maritime engi-

neering. Photographs, tables, diagram, graph. (K1)

663-K. (German.) **Recent Developments and Experiments in Submerged Arc Welding.** W. Mantel and L. Wolff. *Schweissen und Schneiden*, v. 5, no. 9, Sept. 1953, p. 339-347.
Characteristics, structure and properties of welded joints, fluxes, welding electrodes and new methods and equipment. Graphs, tables, photographs, diagrams. 4 ref. (K1)

664-K. (German.) **Safety Devices of Gas Generation and Supply Plants; Their Importance in Welding and Cutting Operations.** M. Konschak and W. Scheruhn. *Schweissen und Schneiden*, v. 5, no. 9, Sept. 1953, p. 347-350.
Evaluates devices used to prevent back firing and back flow of gas. Diagrams. (K2, A7)

665-K. (German.) **Two Rapid-Welding Methods.** *Schweisstechnik*, v. 7, no. 6, June 1953, p. 73-75.
"Gillemont" and "Humboldt-Meller" welding methods. Diagrams. (K6)

666-K. (German.) **Welding of "Torstahl".** Stefan Soretz. *Schweisstechnik*, v. 7, nos. 7/8, July-Aug. 1953, p. 77-90.
Flash-butt and electric fusion welding, tempering and testing of concrete-reinforcing steel rods. Diagrams, graphs, tables, photographs. 5 ref. (K3, K1, J29, ST)

667-K. (German.) **Electric-Arc Welding of Aluminum.** Benno Sixt, *Schweisstechnik*, v. 7, nos. 7/8, July-Aug. 1953, p. 90-93.
Conditions for welding Al and Al alloys. Diagrams, photographs, graphs, tables. (K1, Al)

668-K. The Strength of Metal Joints Made With Synthetic Resins. K. Frey. *Aircraft Engineering*, v. 25, Oct. 1953, p. 317-320.
Influence of geometry of lap joints on their strength. Diagrams, graphs, table. 7 ref. (K12)

669-K. Sheet-Metal Welding. I. Fusion-Welding, Argon-Arc and Heliarc Processes. *Aircraft Production*, v. 25, Oct. 1953, p. 362-371.
New developments in relation to various forms of fusion welding, particularly as applied to argon-arc and submerged-arc processes. Diagrams, photographs. (K1, SS, Ni, Cr)

670-K. Two Inert Gases Are Used to Weld Ultra-Thin Metals. *Industry & Welding*, v. 26, Nov. 1953, p. 53, 54, 82.
Welding of stainless steel sections using argon on top and helium on the underside. Photographs. (K1, SS)

671-K. Flash Welding the Aluminum Alloys. Lester F. Spencer. *Industry & Welding*, v. 26, Nov. 1953, p. 66-68, 71, 72.
Process and critical factors to be controlled. Photographs, diagram. (To be concluded.) (K3, Al)

672-K. The Welding of Certain Heat-Resisting Steels. J. A. McWilliam. *Institute of Welding, Transactions*, v. 16, Aug. 1953, p. 96-99.
Comparison of metal-arc welding of two steels and mechanical test results on parent metals and welds. Tables, photographs, graphs. (K1, AY)

673-K. The Schlieren Apparatus as a Research Tool in the Welding Industry. Walter Moen. *Instrument Society of America, Proceedings*, v. 7, 1952, p. 203-207.
Principle upon which Schlieren apparatus is based; features of optical, mechanical, and electrical design of each of the components; and various techniques developed to meet requirements of problems. (K9)

674-K. Brazing and Soldering Titanium. William Rostoker. *Light Metal Age*, v. 11, Oct. 1953, p. 11, 26.
Problems encountered and procedures employed. (K8, K7, Ti)

675-K. Induction Welding Process Speeds Light Metals Tubing Production. T. J. Crawford. *Light Metal Age*, v. 11, Oct. 1953, p. 14-15, 26.
New process for fabrication of nonferrous metals. Diagrams, photographs. (K6)

676-K. Automatic Arc Welding Aids Assembly of Diesel Engine Parts. Herbert Chase. *Machinery*, v. 60, Oct. 1953, p. 153-157.
Equipment used for submerged-arc welding of internal and external parts. Diagrams, photographs. (K1)

677-K. Adhesives for Metal. *Mechanical World and Engineering Record*, v. 133, Oct. 1953, p. 449.
Developments with polyvinyl formalin and phenol formaldehyde resins make possible strong joints between two metals; and metals and nonmetals. (K12, K11)

678-K. Some Notes on the Control and Design of Parts for Resistance, Spot, Projection and Seam Welding. R. Bushell. *Sheet Metal Industries*, v. 30, no. 318, Oct. 1953, p. 879-884.
Influence of pressure on electrodes, weld time and secondary current. Diagrams, photographs, tables. (K3)

679-K. Correct Welding Procedure. V. Welding of Aluminum-Base Alloys I. Lester F. Spencer. *Sheet Metal Worker*, v. 45, Oct. 1953, p. 61-62, 64, 71, 72.
Fusion welding by resistance, flame, and arc methods. Tabulation of compositions and mechanical properties of aluminum alloys. Tables, photographs. (To be continued.) (K1, K2, K3, Q general, Al)

680-K. Low Hydrogen Electrodes, Fundamentals and Applications. Richard K. Lee and J. O. Cavanagh. *Western Machinery and Steel World*, v. 44, Oct. 1953, p. 101-105.
History, growth, basic fundamentals on effect and control of H_2, welding procedures and applications. Diagrams, photographs. (K1)

681-K. (Dutch.) **The Deposition Rates for Arc Welding Electrodes and Their Tolerances.** P. G. Weeber. *Smit Mededelingen*, v. 8e, no. 2, Apr.-June 1953, p. 57-58; disc., p. 58-59.
Melting speed of welding rods as a function of amperage. Graph. (K1, ST)

682-K. (Dutch.) **Argon-Arc Welding in the Automobile-Body Industry.** P. J. Verlee. *Smit Mededelingen*, v. 8e, no. 2, Apr.-June 1953, p. 63-64.
Electric arc welding under an inert-gas atmosphere. Tables, photograph. (K1)

683-K. (Dutch.) **Some Problems on the Weldability of Steel. The Effect of Segregation on the Weldability of Normal Structural Steel.** A. Ph. Krijff. *Smit Mededelingen*, v. 8e, no. 2, Apr.-June 1953, p. 65-70; disc., p. 70-72.
Possible causes of defective welds. Tables, photographs, micrographs. (K9, ST)

684-K. (Dutch.) **Electrode News.** *Smit Mededelingen*, v. 8e, no. 3, July-Sept. 1953, p. 95-96.
Inversa and Pergo electrodes. Diagrams, photographs. (K1)

685-K. (Dutch.) **The Cracking of Weld Joints.** G. Westendorp. *Smit Mededelingen*, v. 8e, no. 3, July-Sept. 1953, p. 87-94.
Shrinkage stresses, solidification of welds, mechanical properties at high temperatures and crack-sensitivity of different types of fillet welds. Diagrams, graphs, photographs. 10 ref. (K9, Q26)

686-K. (French.) **Recommendations Worked Out by Committee no. 9 (Weldability) of the International Welding Institute.** *Revue de la Soudure (Brussels)*, v. 9, no. 2, 1953, p. 83-87; and insert supplement to this issue, "Suggestions for Classification of Weldability Tests". H. Granjon. p. 1-13.
Minimum conditions imposed on carbon and low manganese steels to make them adaptable to electric-arc welding. Tables. 5 ref. (K9, CN, AY)

687-K. (German.) **Effect of Arsenic on the Hot Working and Weldability of Coppper.** A. Schleicher. *Acta Technica Academiae Scientiarum Hungaricae*, v. 6, nos. 1-2, 1953, p. 201-207.
Effects on weldability, quality of weld, tensile strength and elongation. 13 ref. (K9, Q23, As, Cu)

688-K. (German.) **Shapes and Joints in Machine-Building.** Karl Jurczyk. *Schweissen und Schneiden*, v. 5, no. 7, July, 1953, p. 252-256.
Shapes and joints of plants and animals applied to machine building. Welding techniques employed. Photographs, diagrams. 10 ref. (K general)

689-K. (Russian.) **Building-Up of Cutting Tools by Electric Arc.** M. S. Poliak and G. A. Proskin. *Stanki i Instrument*, v. 24, no. 6, June 1953, p. 21-23.
Compares alloys and presents methods of preparation. Electrode selection. Tables, graphs, diagrams. 5 ref. (K1, TS)

690-K. Special Fixtures Speed Army Tractor Hull Welding. H. W. Lindsay. *American Machinist*, v. 97, Oct. 26, 1953, p. 113-117.
Plant layout, equipment and procedure. Photographs. (K general)

691-K. Machine Welds Powder Cans at 100 Ipm. E. A. Hess. *American Machinist*, v. 97, Oct. 26, 1953, p. 118-119.
Fabrication of oblong powder cans for ordnance. Automatic arc welding set-up fastens head and bottom to body with 3-o'clock welds at high speed. Photographs. (K1)

692-K. Stud Welding. *Automobile Engineer*, v. 43, Oct. 1953, p. 419-420.
Advantages and applications of process by which studs, pins and other small attachments can be welded to surfaces of metal components. (K1)

693-K. Automatic Welding in Castings Repair. *Canadian Metals*, v. 16, Oct. 1953, p. 54, 56, 58.
Tests which demonstrate merits of above, using a heavy steel casting for the investigation described. Photographs, table. (K general, ST)

694-K. The Metallurgy of Welding Manganese Steel. *Edgar Allen News*, v. 32, Oct. 1953, p. 222-224.
Technique for avoiding embrittlement. Micrographs, table. (To be concluded.) (K general, AY)

695-K. Modern Welding Technique. XIX. Stainless and Heat-Resisting Steels. XX. Miscellaneous Non-Ferrous Alloys. E. T. Gill and Eric N. Simons. *Edgar Allen News*, v. 32, Oct. 1953, p. 233-234.
Gas, atomic hydrogen and metallic-arc welding of stainless steels, heat resisting steels, nickel and nickel alloys. Table. (To be continued.) (K1, K2, SS, Ni)

696-K. Current-Slope Control for Resistance Welders. R. O. Johnsen. *Electronics*, v. 26, Nov. 1953, p. 158-159.
Simple six-tube unit which permits control of buildup and decay rates of welding curent, and gives longer electrode tip life and more uniform welds on aluminum and magnesium. Photograph, diagrams. (K3, Al, Mg)

697-K. Development of Inert-Gas Welding. *Steel Horizons,* v. 15, Fourth Quarter, 1953, p. 24.

Explanation of two modern methods and advantages on stainless steel of various thicknesses. Photographs. (K1, SS)

698-K. Hard-Zone Crack Sensitivity and Strength of Two Low-Alloy Steels. C. L. M. Cottrell, J. G. Purchas, and B. J. Bradstreet. *Welding Research,* v. 7, Aug. 1953, p. 76-79.

Mechanical and weldability tests. Effect of heat treatment at various temperatures on mechanical properties and microstructure of two steels. Tables, graphs, photographs. 2 ref. (K9, Q general, M27, AY)

699-K. Self-Adjusting Arc and Controlled-Arc Welding Processes. W. G. Hull and J. C. Needham. *Welding Research,* v. 7, Aug. 1953, p. 80-95.

Essential features and fundamental aspects of processes, such as arc characteristics and material transfer. Reports information available on welding of ferrous and nonferrous materials. Tables, photographs, graphs, diagrams. 25 ref. (K1)

700-K. Fusion Welding Provides Projection-Free Surfaces On High-Heat Super Alloys. J. R. Fullerton. *Western Metals,* v. 11, Oct. 1953, p. 78-81.

Types of shielded-arc welding including "Heliarc", "Sigma", "Unionmelt", atomic hydrogen and coated electrode methods. Photographs. (K1)

701-K. (German.) **Riveting in Light-Metal Structures.** E. W. Pleines. *Aluminium,* v. 29, no. 9, Sept. 1953, p. 370-374.

Functions and qualities of cold headed, light-metal rivets. Concludes that cold upset rivets without heads meet minimum safety specifications. Diagrams, graph, table. (K13, Al)

702-K. (German.) **Oxy-Acetylene Welding of Aluminum Materials.** *Aluminium Ranshofen, Mitteilungen,* 1953, no. 2, July, p. 30-34.

Weldability and procedure for welding aluminum and its alloys. Diagram, tables. (K2, Al)

703-K. (German.) **Repair of Iron Castings by Welding.** Hans Höll. *Schweissen und Schneiden,* v. 5, no. 10, Oct. 1953, p. 368-374.

Shrinkages and stresses of gray cast iron. Carbon-arc welding with partial preheating, preheating and post heating; brazing; straightening of iron castings; and electric welding with pre and postheating. Photographs, micrographs, diagrams. (To be continued.) (K1, K8, K6, CI)

704-K. (German.) **Development of Plain Carbon Steel Welding Electrodes With Lime Coating.** Camille De Rop and Hans Schmidt-Bach. *Stahl und Eisen,* v. 73, no. 19, Sept. 10, 1953, p. 1212-1215.

Good bead formation without pores. Results of fatigue tests under pulsating stresses; and folding, tensile and notched-bar impact tests. Tables, graphs, photographs. 12 ref. (K1)

705-K. (Book.) **Design of Structural Welded Details.** F. H. Abrahms. 2 Ed. 1953. 76 p. Association of Engineering and Shipbuilding Draughtsmen, Onslow Hall, The Green, Richmond, Surry, England. 3s.

Data on strength of various types of welds. Design of angle and beam connections, plate girders, stanchion bases, and roof trusses. Illustrations. (K general)

706-K. (Book.) **The Joining of Metals.** 174 p. Institution of Metallurgists. 4 Grosvenor Gardens, London S.W. 1, England. 14 s.

Includes "Metallurgical Principles of Joining of Metals", Hugh O'Neill; "Metallurgy of the Welding of Nonferrous Metals", W. K. B. Marshall; "Metallurgy of Welding of Carbon and Low-Alloy Steels", L. Reeve; "Metallurgy of Welding of the Cr-Ni Austenitic Steels", F. H. Keating; "Metallurgy of Soldering and Brazing", J. C. Chaston; and "Determination of Weldability", J. B. Ball. (K general)

707-K. (Book.) **Weld Standards.** 19 p. Lincoln Electric Co., Cleveland 17, Ohio. $1.00.

Standards cover manual butt welding, fillet welds, and lap and corner welds in all positions in both plate and sheet metal. Use of tracing paper makes the standards easy to reproduce by blueprinting or other methods. (K general, S22)

L

Cleaning, Coating and Finishing

658-L. A Dynamic Test for Detergency of Hard Surfaces. Manuel N. Fineman. *ASTM Bulletin,* 1953, no. 192, p. 49-55.

Test method to determine efficiency of detergents in cleaning wide variety of surfaces. Graphs, tables. 11 ref. (L12)

659-L. The Effect of Sheet Steel Quality on Vitreous Enamel Coatings. L. S. Heard. *Australasian Engineer,* 1953, Aug. 7, p. 43-47.

Results of tests on enamelled linings and sheet material. Micrographs, tables. (L27, CN)

660-L. Some Notes on the Microstructures of Enamelled Iron Castings. E. R. Evans. *British Cast Iron Research Association. Journal of Research and Development,* v. 5, Aug. 1953, p. 15-18.

Four microspecimens and reasons for occurrence of blisters. Micrographs, table. (L27, M27, CI)

661-L. The Relevance of Casting Skin to the Incidence of Blistering in Cast Iron Enamels. E. R. Evans. *British Cast Iron Research Association. Journal of Research and Development,* v. 5, Aug. 1953, p. 19-25.

Testing procedure, preparation of test pieces, processing plates and results. Tables, diagrams. (L27, CI)

662-L. Silicone Finishes for High Temperature Applications. R. C. Hedlund. *Finish,* v. 10, Oct. 1953, p. 45-46, 107-108.

Ability of silicone resins to resist heat and corrosion. Photographs. (L26)

663-L. The Painting of Steel. J. C. Hudson. *Institute of Metal Finishing, Transactions, Advance Copy* no. 1, v. 29, 1953, 22 p.

Developments in protective painting; further research suggested. Graphs, micrographs, tables. 21 ref. (L26, ST)

664-L. Recent Development in Metal Spraying by the Powder Process. William McDermott. *Institute of Metal Finishing, Transactions, Advance Copy* no. 3, v. 29, 1953, 10 p.

Improved powder spraying pistol which permits application of denser, less oxidized and better adherent coatings of Tn, Al and other coating metals. Table, diagrams. (L23, Sn, Cu, Pb, Zn, Al, ST)

665-L. Recent Advances in Metal Spraying by the Wire Process. W. E. Ballard. *Institute of Metal Finishing, Transactions, Advance Copy* no. 4, v. 29, 1953, 8 p.

Trends of wire spraying industry during past five years. Photographs. 8 ref. (L23, Al, ST)

666-L. A Laboratory Study of a Commercial Method of Electroplating Aluminium. J. Edwards and C. J. Swanson. *Institute of Metal Finishing, Transactions, Advance Copy* no. 5, v. 29, 1953, 11 p.

Laboratory-scale investigation of mechanism of electrolytic process for improvement and simplification. Tables. (L17, Al)

667-L. Complex Fluorides for the Deposition of Tin and Tin Alloys. A. E. Davies, R. M. Angles, and J. W. Cuthbertson. *Institute of Metal Finishing, Transactions, Advance Copy* no. 7, v. 29, 1953, 14 p.

Effects of addition agents, anode sludging and electrode efficiencies. Tables, graphs, micrograph. 11 ref. (L17, Sn)

668-L. Structural and Kinetic Phenomena Observed During the Anodic Polarization of Metals. H. R. Thirsk and W. F. K. Wynne-Jones. *Institute of Metal Finishing, Transactions, Advance Copy* no. 9, v. 29, 1953, 14 p.

Variety of methods useful in studying reactions at electrodes. Diagrams, micrographs, graphs. 19 ref. (L19, M26, Ni, Cu)

669-L. The Rate-Determining Stage in the Anodic Dissolution of Metals. A. Hickling and J. K. Higgins. *Institute of Metal Finishing, Transactions, Advance Copy* no. 10, v. 29, 1953, 18 p.

Experimental study, using potentiostat technique, of the limiting current densities of metal dissolution in electrolytic polishing solutions. Graphs, tables, diagram. 9 ref. (L13, Zn, Cu)

670-L. Bright Metal Surfaces and a Theory of Bright Plating. T. P. Hoar. *Institute of Metal Finishing, Transactions, Advance Copy* no. 11, v. 29, 1953, 8 p.

Several methods by which bright metal surfaces may be produced. Compares fundamental mechanisms of methods and shows how bright plating may be included in general plan. (L17, Ni, Co, Sn)

671-L. Economy in Metal Finishing. S. Wernick. *Institute of Metal Finishing, Transactions, Advance Copy* no. 12, v. 29, 1953, 8 p.

Ways of preventing increasing costs in metal finishing industry. Warns against danger of "short cuts". (L general, Zn, Al)

672-L. Effect of Chloride on the Deposition of Copper, in the Presence of Arsenic, Antimony, and Bismuth. V. Hospadaruk and C. A. Winkler. *Journal of Metals,* v. 5; *American Institute of Mining and Metallurgical Engineers, Transactions,* v. 197, 1953, p. 1375-1377.

Graphs and table. 6 ref. (L17, Cu, As, Sb, Bi)

673-L. Finishes for Aluminum. R. V. Vanden Berg. *Machine Design,* v. 25, Oct. 1953, p. 177-186.

Applications and processes. Photographs, graphs, table, diagram. (L general, Al)

674-L. Specification of Color in Finishes. Carl R. Smedley. *Machine Design,* v. 25, Oct. 1953, p. 187-192.

Pigments for use in organic and synthetic coatings. Photographs, table. (L26)

675-L. How to Descale Titanium. A. E. Durkin. *Materials & Methods,* v. 38, Oct. 1953, p. 107-109.

Molten caustic baths most practical method. Tables, graphs. 6 ref. (L12, Ti)

676-L. Sequestering Agents in Aluminum Etching. Francis J. Prescott, John K. Shaw, and Jay Lilker. *Metal Finishing,* v. 51, Oct. 1953, p. 65-67.

Use of gluconic acid resulted in a decrease in amount and adherence of scale. Photographs, table. 12 ref. (L12, Al)

677-L. Electroplating on Beryllium. John G. Beach and Charles L. Faust. *Metal Finishing,* v. 51, Oct. 1953, p. 68-70, 73.

Processes, adhesion testing and inspection methods. Diagram. 3 ref. (L17, Be)

678-L. Washing Dollars Out of Deburring. Gordon B. Ashmead. *Metal Finishing,* v. 51, Oct. 1953, p. 71-73.

Tumbling process. Photographs. (L10)

679-L. Priming Paints for Light Alloys. J. G. Rigg and E. W. Skerrey. *Metal Industry,* v. 83, Sept. 25, 1953, p. 259-261.

Tests carried out on a number of light alloys to determine relative resistance of four types of primary pigments to varying atmospheric conditions. (L26)

680-L. Powder Iron Parts Cadmium Plated. *Metal-Working,* v. 9, Oct. 1953, p. 12-13.

Plating of parts after impregnation with polyester resin. Photographs. (L26, H16, Fe, Cd)

681-L. Time Charts for Tumbling and Degreasing Mild Steel Parts. *Metal-Working,* v. 9, Oct. 1953, p. 26-27.

Tumbling and vapor degreasing. Graphs. (L10, L12, CN)

682-L. Abrasive Blasting Removes Flash From Die Cast Toys. *Precision Metal Molding* v. 11, Oct. 1953, p. 71-72.

Advantages of process. Photographs. (L10, Al, CN)

683-L. Spotlighting Finishing Progress. Sulfamate Nickel Plating. Sulfide-Cyanide Copper Stripping. C. Fred Gurnham. *Products Finishing,* v. 18, Oct. 1953, p. 54, 56, 58, 62, 64, 66, 68, 70, 74, 76, 78, 80, 82, 84.

Processes and their advantages over older methods. Photographs, graph. (L17, L12, Ni, Cu)

684-L. Cleaning Stainless Steel Work. II. E. M. Rains. *Sheet Metal Worker,* v. 44, Sept. 1953, p. 80-81, 141.

Cleaning of outdoor installations, place of chemical cleaners in difficult jobs, how to remove hard water-detergent film, eliminating stencils and grease pencil marks, and methods for cleaning industrial equipment. Photographs. (Concluded.) (L12, SS)

685-L. Coils Spin Through Rotary Pickler. *Steel,* v. 133, Sept. 28, 1953, p. 92, 94.

Principle and operation of high-speed pickler for cleaning and oiling. Diagrams, photographs. (L12)

686-L. Coating Takes on Life Saving Role. *Steel,* v. 133, Sept. 28, 1953, p. 90.

Use of Mo coating as a finish on metals. Photographs. (L15, Mo)

687-L. Gear Deburring. Brush Setup Matches Production Pace. William J. Maund. *Steel,* v. 133, Sept. 28, 1953, p. 120-122.

Equipment and operation of automatic deburring machine. Photographs, tables. (L10)

688-L. (French.) **Hot Tinning.** G. Haas. *Métallurgie et la construction mécanique,* v. 85, no. 8, Aug. 1953, p. 629-631.

Tinning baths and usual methods for tinning steel. (L16, ST)

689-L. (German.) **Fields of Application for Polishing Agents.** W. Hofmann. *Metalloberfläche,* Ausgabe B, v. 5, no. 8, Aug. 1953, p. 121-124.

Materials and working procedures. (L10)

690-L. (German.) **Adhesive Strength and Corrosion of Electroplated Aluminum.** F. Solar. *Metalloberfläche,* Ausgabe B, v. 5, no. 8, Aug. 1953, p. 117-120.

Causes of poor bond between base and plating metals. Photographs, graphs, tables, diagram. (L17, R general, Al)

691-L. (German.) **Behavior of Anodes in Cyanide Baths.** W. Machu and A. M. Azzam. *Werkstoffe und Korrosion,* v. 4, nos. 8/9, Aug.-Sept. 1953, p. 298-307.

Mechanism of passivation of Cu in solutions of NaCN and $Na-Cu(CN)_2$ by anodic treatment. Increased concentration of the solutions retards passivation. Graphs, tables. 15 ref. (L17, R10, Cu)

692-L. Some Observations on the Preece Test and Stripping Tests for Zinc-Coated Wires. G. A. Ellinger, W. J. Pauli, and T. H. Orem. *American Society for Testing Materials, Preprint* no. 3s, 1953, 11 p.

Investigation to determine validity of the Preece test under varying conditions. Graphs. 7 ref. (L16, S14, Zn)

693-L. A Laboratory Evaluation of Ceramic Coatings for High Temperature Applications. Sara J. Ketcham. *American Society for Testing Materials, Preprint* no. 92c, 1953, 8 p.

Tests to determine resistance to thermal shock, protection against oxidation and adherence. Results of tests on coated 4130 steel. Micrographs, photographs. (L27, AY)

694-L. Tension Tests of Porcelain Enameled Steel. W. A. Deringer. *American Society for Testing Materials, Preprint* no. 92d, 5 p.

Tensile properties of glass or porcelain enamel coating on steel tension specimens studied to determine relationship between yield point of the steel and stress and strain required to cause the porcelain enamel coating to crack. Graphs. (L27, ST)

695-L. High-Temperature Ceramic Coatings as Applied to Aircraft Power Plants. B. L. Paris. *American Society for Testing Materials, Preprint* no. 92f, 1953, 8 p.

Expected benefits to be derived. Properties of these coatings and the position of the industrial engineer relative to the over-all program. Photographs, tables. (L27)

696-L. Theory and Practice of Chemical Polishing. I. Chemical Processes for Copper-Base Alloys. R. Pinner. *Electroplating and Metal Finishing,* v. 6, Oct. 1953, p. 360-367.

Chemical polishing compared to and contrasted with electro-polishing and mechanical polishing. Refers to an unpublished method for copper-based alloys and nickel with certain advantages over the Battelle process. Other new work. Table, graphs. (L12, L13, L10, Cu, Ni)

697-L. An Automatic Bright Dipping Plant. *Electroplating and Metal Finishing,* v. 6, Oct. 1953, p. 368-369.

Construction, operating sequence, transfer mechanism and solution control. Photographs. (L16)

698-L. Gas Plating—Its Possibilities in Industry. John E. Hyler. *Finish,* v. 10, Nov. 1953, p. 48, 56, 89.

Recent rapid plating process and its specific advantages. Photographs. (L general)

699-L. How We Prepare and Paint Metal Furniture. Robert J. Deisenroth. *Industrial Finishing,* v. 29, Oct. 1953, p. 30-31, 33-34, 36, 38.

Equipment, plant layout and operating procedures. Photographs. (L26)

700-L. A Porosity Test for Electrodeposits on Zinc-Base Die-Castings. H. K. Lutwak. *Institute of Metal Finishing, Bulletin,* v. 3, Summer 1953, p. 85-91.

New method using a solution of ammonium chloride and potassium ferrocyanide. 8 ref. (L17, Zn)

701-L. Roughness in Bright Nickel Electrodeposits. C. J. Swanson. *Institute of Metal Finishing, Bulletin,* v. 3, Summer, 1953, p. 91-112.

Causes of various types of surface defects. Photographs, tables. 6 ref. (L17, Ni)

702-L. Tin-Nickel Alloy Coatings—Estimation of Thickness and Porosity. S. C. Britton and D. G. Michael. *Institute of Metal Finishing, Bulletin,* v. 3, Autumn, p. 143-162.

Electrolytic dissolution of tin-nickel alloy in phosphoric acid solution at 180° C. Porosity best determined by ferricyanide method. Photographs, graphs, tables. 7 ref. (L17, Sn, Ni)

703-L. Practical Aspect of the Plating of Aluminum Hollow-Ware. R. Ore. *Institute of Metal Finishing, Bulletin,* v. 3, Autumn, p. 163-172.

Process for nickel and chromium plating on aluminum tea pots. Photographs, tables, diagrams. (L17, Al, Cr, Ni)

704-L. The Crystal Structure of Electrodeposited Tin Coatings on Iron Single Crystals. D. J. Evans. *Institute of Metal Finishing, Bulletin,* v. 3, Autumn, p. 173-180.

Electron diffraction studies of tin on oriented iron crystals. Anomalies explained. Photographs, table, diagrams. (L17, M22, M26, Fe, Sn)

705-L. Rhodium Plating and Its Modern Applications. E. H. Laister and R. R. Benham. *Institute of Metal Finishing, Bulletin,* v. 3, Autumn, p. 181-203.

Plating with rhodium (sulfate process), and its advantages relative to resistance to heat and corrosion. Photograph, tables. (L17, Rh)

706-L. Fluoride v. Sulphate Hard Chrome Solutions. Which Offers Better Plating Properties? R. A. Balbiers and H. D. Burgess. *Iron Age,* v. 172, Oct. 22, 1953, p. 126-130.

Advantages of fluoride-catalyzed chrome plating solutions over standard sulfate baths. Graphs, tables. 7 ref. (L17, Cr)

707-L. Plating Gun Bores Gives Greater Accuracy and Longer Life. C. E. McDowell. *Machinery,* v. 60, Oct. 1953, p. 158-163.

Technique for hard chromium plating of tube bores for 90-mm. tank guns. Photographs. (L17, Cr)

708-L. Hot Dip Aluminising. M. L. Hughes and D. P. Moses. *Metallurgia,* v. 48, no. 287, Sept. 1953, p. 105-122.

Influence on properties of steel base, procedures and operation of a pilot plant for continuous coating and advantages and disadvantages of process. Tables, micrographs, macrographs. 29 ref. (L16, Al)

709-L. Electroplating in Lithography. G. N. Martin. *National Lithographer,* v. 60, Oct. 1953, p. 60-62.

Copper-chromium, copper stainless steel, and copper-aluminum plates; brush plating for correction and repair; and preparation of press rollers. (L17, Al, Cr, Cu, SS)

710-L. The Why and Wherefore of Automotive Finishing and Testing. Wardley D. McMaster. *Paint Manufacture,* v. 23, Oct. 1953, p. 325-332.

General finishing problems and testing procedures involved in developing a finish protective to metallic elements and pleasing in appearance. Photograph, tables, graphs. 10 ref. (L general)

711-L. Electrostatic Paint Spraying. Richard Tilney. *Paint Manufacture,* v. 23, Oct. 1953, p. 335-336.

Development of techniques to atomize the coating material and to deposit it on the workpiece. Photograph, diagram. (L26)

712-L. The Uniformity of Galvanized Coatings and the Expected Life of the Galvanized Article. N. B. Rutherford. *Sheet Metal Industries,* v. 30, no. 318, Oct. 1953, p. 891-898.

Withdrawal conditions were much more important than presence or

absence of small aluminum content in producing uniform coatings. A modified practice made possible a reduction in zinc consumption without affecting expected life of galvanized ware. Diagrams, tables. 9 ref. (L16)

713-L. The Strains in Vitreous Enamels Fired on Metals. H. Moore. *Sheet Metal Industries,* v. 30, no. 318, Oct. 1953, p. 909-914.

Effects of differences between expansion coefficients of enamel coating and metal. Tables, diagram. (L27)

714-L. Aluminum Electrodeposits Made Adherent. W. C. Schickner. *Steel,* v. 133, Nov. 2, 1953, p. 125.

Method of dipping metal to be plated in fatty acid solution to give strong bond with base. Photographs. 2 ref. (L17, Al)

715-L. Phosphate Coating; Extra Step Is Shortcut to Quality Finishes. *Steel,* v. 133, Oct. 26, 1953, p. 158-159.

Porous buffer zone which holds organic finishes prevents rusting or confines it to exposed surfaces; and provides cushion that is flexible enough to resist impact and bending. Photographs, tables. (L14)

716-L. Finishes for Metals. I. Cleaning and Surface Preparation. Robert A. Wason. *Tool Engineer,* v. 31, Nov. 1953, p. 69-78.

Necessity of adequate preparation of metal for finishing and methods of mechanical, temperature and chemical cleaning. Photographs. (To be continued.) (L10, L12)

717-L. Animal Fats in Hot Dip Tinning. E. G. Fochtman, L. C. Kinney, G. G. Ference, R. W. Riemenschneider, S. G. Morris and W. C. Ault. *U. S. Dept. of Agriculture, Bureau of Agriculture and Industrial Chemistry, AIC* 354, 1953, 14 p.

Better grades of greases and tallows with appropriate processing perform as well or better than palm oil. Cost of processing is not prohibitive and price of the finished oil is favorable compared to average prices of palm oil. Tables. (L16)

718-L. (English.) Electrolytic Polishing of Special Steel and Alloys. *Aciers Fins and Speciaux Francais,* 1953, no. 14, July, p. 32-37.

Potentialities for industrial use and properties of finished surfaces. Photographs. (L13, ST, AY)

719-L. (French.) On the Mechanism of Electrolytic Polishing. Eugene Darmois and Israel Epelboin. *Comptes rendus,* v. 237, no. 10, Sept. 7, 1953, p. 503-504.

Process explained by the passage of chlorate ions by adsorption to the surface to be polished. The layer formed contains sufficiently intensive electric field to cause the metal ions to pass directly into the solution. 6 ref.
(L13, Na, Mg, Al, Fe, Ni, Cu, Pb, Hg)

720-L. (French.) Practical and Comparative Study of Some Processes for the Preparation of Cast Metal Before Electrolytic Coating, or Coating by Immersion in Molten Metals. G. Lerouge. *Metaux, Corrosion-Industries,* v. 28, no. 337, Sept. 1953, p. 348-369.

Tests with nickel, chromium and tin coatings on various types of castings. Micrographs, tables, diagrams. 12 ref.
(L10, L12, L13, Ni, Cr, Sn)

721-L. (French.) Defects of Alumina Films in Relation to the Structure of Aluminum and Its Alloys. P. Bussy. *Revue de Métallurgie,* v. 50, no. 9, Sept. 1953, p. 629-634.

Electron microscopic studies of thin alumina films obtained by anodic oxidation. Effects of additions and the rate of cooling upon the structure. Micrographs. 11 ref.
(L19, M21, Al)

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MIL-C-16232 Type I	Coatings — phosphate; oiled, slushed, or waxed (for ferrous metal surfaces) and phosphate treating compounds.
AN-F-20 (See also U.S.A. 3-213)	Finishes, for electronic equipment.
U.S.A. 57-0-2C Type II, Class A	Finishes, protective, for iron and steel parts.
U.S.A. 51-70-1 Finish 22.02, Class A	Painting and finishing of fire control instruments; general specification for
M-364	Navy aeronautical process specification for compound phosphate rust-proofing process.

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722-L. (German.) **Equipment for Testing Anodic Coatings. II.** *Aluminium Ranshofen Mitteilungen,* 1953, no. 2, July. p. 34-35.

Thickness and quality of anodic film can be determined by measuring dielectric strength of aluminum. Graph. (L19, S14, Al)

723-L. (German.) **Advances in Phosphating.** H. Keller. *Metalloberfläche,* Ausgabe A, v. 7, no. 9, Sept. 1953, p. 129-136.

Surface treatment by phosphating and similar processes. Emphasizes rapid advances being made and economic aspects. Photographs, graphs, diagram. 6 refs. (L14)

724-L. (German.) **Stripping Electroplated Coatings by Chemical Processes.** Richard Erdmann. *Metalloberfläche,* Ausgabe B, v. 5, no. 9, Sept. 1953, p. 141-142.

Processes for removing coats of nickel, silver, gold, copper, zinc, cadmium, chromium, tin and brass. (L12, Ni, Ag, Au, Cu, Zn, Cd, Cr, Sn)

725-L. Abrasive Shot Cuts Sheet, Strip Cleaning Costs. Gilbert D. Dill. *Iron Age,* v. 172, Oct. 29, 1953, p. 91-93.

Equipment, technique and advantages over pickling process. (L10, ST)

726-L. Flux Supplies Alloy for Hard Surfacing Manipulators. Fred H. Knibbs, *Iron Age,* v. 172, Oct. 29, 1953, p. 98-99.

New technique in use on mild steel in which alloy content of deposited metal is supplied by flux rather than electrode wire. Photographs, tables. (L24, ST)

727-L. Recent Developments in the Plating of Aluminium. *Light Metals,* v. 16, Oct. 1953, p. 344-346.

Electrolytic zincate dip pretreatment and copper flash process prior to subsequent plating with nickel or chromium. Direct plating techniques and corrosion resistance of finishes. Tables. 29 ref. (L17, Al, Cu, Ni)

728-L. Black Chromium-Base Electroplating. M. F. Quaely. *Metal Industry,* v. 83, Oct. 9, 1953, p. 299-300.

Methods tried before a satisfactory solution was obtained. Indicates three methods by which an adherent black coating can be obtained. 6 ref. (L17, Cr)

729-L. Relative Importance of Various Sources of Defect-Producing Hydrogen Introduced Into Steel During Application of Vitreous Coatings. Dwight G. Moore, Mary A. Mason and William N. Harrison. *U. S. National Advisory Committee for Aeronautics, Report* 1120, 1953, 12 p.

Results show that dissolved water in the frit is the principal source of hydrogen. In normal enameling operations chemically combined water in the clay, milling water, quenching water and acid pickling are minor sources of hydrogen. Tables, graphs, micrographs, diagram. (L27, CN)

730-L. (French.) **Practical and Comparative Study of Several Processes in the Preparation of the Casting Before Coating by Electrolysis or by Immersion in Molten Metals.** G. Lerouge, *Metaux, Corrosion-Industries,* v. 28, nos. 335-336, July-Aug. 1953, p. 302-318.

Attempts to eliminate foundry "skin" and graphite carbon. Deposits effected on differently prepared metals. Tables, micrographs, diagrams. (To be continued.) (L17, L16, E25, CI)

730-L. (German.) **Problems and Testing of Paints and Lacquers on Light Metals.** W. Toeldte. *Aluminium,* v. 29, no. 10, Oct. 1953, p. 413-416.

Various problems in application and testing. 4 ref. (L26, R general, EG-a)

732-L. (German.) **Questions Regarding the Painting of Metals.** Heinz Anders. *Metalloberfläche,* Ausgabe A, v. 7, no. 9, Sept. 1953, p. 139-141.

Organic coatings used to impart high-impact strength to metals. 10 ref. (L26)

733-L. (German.) **Special Chromium Plating Equipment.** *Metalloberfläche,* Ausgabe A, v. 7, no. 10, Oct. 1953, p. 152-157.

Equipment for plating large quantities of small and special parts. Photographs. (L17, Cr)

734-L. (German.) **Copper Baths for the Formation of Heavier Intermediate Layers for Subsequent High-Luster Nickel and Chromium Platings.** Erich Gerber. *Metalloberfläche,* Ausgabe B, v. 5, no. 10, Oct. 1953, p. 152-153.

Advises use of proper cyanide-copper baths. (L17, Ni, Cr, Cu)

735-L. (German.) **The Adhesive Strength of Nickel-Chromium Deposits.** Arvid v. Krustenstjern. *Metalloberfläche,* Ausgabe B, v. 5, no. 10, Oct. 1953. p. 153-154.

Thorough cleaning was shown to be necessary for good adherence. Photographs, table. (L17, Ni, Cr)

736-L. (German.) **D-Chromium Plating.** Artur Kutzelnigg. *Metalloberfläche,* Ausgabe B, v. 5, no. 10, Oct. 1953. p. 156-160.

Special uses on different metals. Photographs, micrographs. 6 ref. (L17, Cr)

737-L. (German.) **Recent Developments in Chromium Deposition.** Heinz W. Dettner. *Metalloberfläche,* Ausgabe B, v. 5, no. 10, Oct. 1953, p. 149-151.

Reviews recent literature on improved methods. Graphs. 23 ref. (L17, Cr)

738-L. (German.) **Removing Chromium, Especially Hard Chromium.** A. Pollack. *Metalloberfläche,* Ausgabe A, v. 7, no. 10, Oct. 1953, p. 157-158.

Electrolytic removal of chromium with and without nickel base. 5 ref. (L17, Cr, Ni)

739-L. (Russian.) **Removal of Scale With Sodium Hydride.** A. V. Smirnov, S. A. Semenkovich, and F. A. Bogachev. *Vestnik Mashinostroeniia,* v. 33, no. 3, March 1953, p. 37-39.

Process reducing metal losses for any composition and structure of scale. Diagram, table. (L12)

740-L. (Book.) **Enamel Bibliography and Abstracts.** Roger L. Fellows, compiler. 487 p. 1953. American Ceramic Society, 2525 N. High Street, Columbus 2, Ohio.

A compilation of all published material from 1940 to 1949. Includes abstracts on porcelain enameling and references pertaining to refractory coatings for metals. (L27)

741-L. (Book—German.) **(Hard Chromium) Hartchrom.** Heinrich Arend, Heinz W. Dettner. 1952. 183 p. Verlag W. Girardet, Essen, Germany. 19.60 DM.

Process of hard chromium deposition. Photographs, diagrams, tables. (L17, Cr)

742-L. (Book—German.) **(Flame Spraying of Steel, Metals, and Plastics) Flammspritzen von Stahl, Metallen, und Kunststoffen.** J. C. Fritz. 1953. 138 p. Verlag W. Girardet, Essen, Germany, 16.80 DM.

Properties and testing of sprayed coatings. Equipment, methods of spraying, preparation of surface, and costs. Photographs, diagrams, tables. (L23)

A.S.M. MIDWINTER MEETING

Hotel Statler

Boston, Mass.

March 4-5, 1954

Metallography, Constitution and Primary Structures

385-M. Isothermal Transformation of Titanium-Manganese Alloys. P. D. Frost, W. M. Parris, L. L. Hirsch, J. R. Doig, and C. M. Schwartz. *American Society for Metals, Preprint* no. 7, 1953, 16 p.

Observations on binary Ti alloys containing 2.91, 7.72, and 12.3 wt. % Mn at temperatures between 450 and 650° C. Tables, graphs, micrographs. 5 ref. (M24, Ti, Mn)

386-M. The System Zirconium-Aluminum. D. J. McPherson and M. Hansen. *American Society for Metals, Preprint* no. 13, 1953, 18 p.

Phase diagram for arc-cast and heat treated specimens established by metallographic analyses, X-ray diffraction, incipient melting and thermal analysis studies. Tables, graphs, micrographs. 10 ref. (M24, Zr, Al)

387-M. A Study of the Fe-Fe_2B System. C. C. McBride, J. W. Spretnak, and Rudolph Speiser. *American Society for Metals, Preprint* no. 22, 1953, 22 p.

Solubility of boron in iron determined by equilibrating Fe-Fe_2B sandwiches and analyzing the resultant cores spectrographically for boron. Tables, graphs, micrographs. 12 ref. (M27, S11, Fe, B)

388-M. Equilibrium Structures in Fe-Cr-Mo Alloys. J. G. McMullin, S. F. Reiter, and D. G. Ebeling. *American Society for Metals, Preprint* no. 28, 1953, 8 p.

Isothermal sections of the Fe-Cr-Mo ternary diagram at 1500 and 1650° F. Tables, graphs, micrograph. 10 ref. (M24, Fe, Cr, Mo)

389-M. A Survey of Vanadium Binary Systems. W. Rostoker and A. Yamamoto. *American Society for Metals, Preprint* no. 29, 1953, 26 p.

Pertinent information on terminal solubility limits, identities of intermediate phases, and reactions between intermediate phases and terminal solid solutions of 21 binary systems. Tables, graphs, micrographs. 67 ref. (M24, V)

390-M. Effective Diameter of Solute Atoms in Interstitial Solid Solutions. Rudolph Speiser, J. W. Spretnak, and W. J. Taylor. *American Society for Metals, Preprint* no. 4W, 1953, 6 p.

Formulas derived relating the observed change of lattice parameter in interstitial solid solutions to effective diameter of the solute atom. Table. 10 ref. (M26, Fe, Ti, Zr)

391-M. Progress in Metallurgical Microscopy. B. W. Mott. *Endeavour,* v. 12, July 1953, p. 154-161.

Advances in techniques for investigating surface topography, polarized light and microscopy of hot metal surfaces. Diagrams, micrographs. 41 ref. (M21)

392-M. The Cold Rolled Texture of Titanium. D. N. Williams and D. S. Eppelsheimer. *Journal of Metals,* v. 5; *American Institute of Mining and Metallurgical Engineers, Transactions,* v. 197, 1953, p. 1378-1382.

Specimens examined using the Shulz-Decker Geiger counter technique. Tables, diagrams. 8 ref. (M23, Q24, Ti)

393-M. Interface Area, Edge Length and Number of Vertices in Crystal Aggregates With Random Nucleation. J. L. Meijering. *Philips Research Reports,* v. 8, Aug. 1953, p. 270-290.

Vertices in "cell model" and "Johnson-Mehl" model. Tables, graphs, diagrams. 10 ref. (M26, N2)

394-M. A Comparison of the Powder Patterns on a Sample of Grain-Orientated Silicon-Iron With Those Obtained on a Single Crystal. L. F. Bates and A. Hart. *Physical Society, Proceedings,* v. 66, no. 405A, Sept. 1953, p. 813-818.

New pattern, conditions for appearance and data on domain boundary spacings. Diagram, graph. 4 ref. (M26, Fe, Si)

395-M. A Study of Bitter Figures on the (110) Plane of a Single Crystal of Nickel. L. F. Bates and G. W. Wilson. *Physical Society, Proceedings,* v. 66, no. 405A, Sept. 1953, p. 819-822.

Magnetic domain structure of a single crystal of Ni cut so that two easy directions of magnetization lay in the plane of each main surface. Diagram, graph. 6 ref. (M26, P16, Ni)

396-M. A Proposed Structure for Certain Domain Configurations on a Single Crystal of Nickel. G. W. Wilson. *Physical Society, Proceedings,* v. 66, no. 405A, Sept. 1953, p. 840-841.

Diagram. 3 ref. (M26, P16, Ni)

397-M. Metallographic Examination of Hot Metal Surfaces. B. W. Mott and S. D. Ford. *Research,* v. 6, Oct. 1953, p. 396-400.

Apparatus for microscopic examination of easily oxidized, refractory metals at temperatures up to 1000° C. Diagram, photograph. 12 ref. (M21, U, Be, Zr)

398-M. (French.) Modification of High Silicon-Aluminum Alloys and the Corresponding Structures. Claude Mascre. *Fonderie,* 1953, no. 19, p. 3556-3563.

Action of P and Na on hypereutectic Al-Si alloys. Micrographs, tables, graphs, diagrams. 6 ref. (M27, Al, Si)

399-M. (German.) Phase Diagram: Iron - Iron Phosphide - Molybdenum Phosphide-Molybdenum. Rudolf Vogel and Dietrich Horstmann. *Archiv für das Eisenhüttenwesen,* v. 24, nos. 7-8, July-Aug. 1953, p. 369-374.

Shows existence of an eutectic between Mo and MoP. Molybdenum exhibits stronger affinity for P than does Fe. Graphs, photographs, diagrams. 8 ref. (M24, Fe, Mo)

400-M. (German.) Method and Examples of Application of X-Ray Tensile Testing. A. Schaal. *Schweizer Archiv für angewandte Wissenschaft und Technik,* v. 19, no. 7, July 1953, p. 211-217.

Fundamentals of stress measurement by X-ray diffraction and uses for methods described. Photographs, graphs, tables, diagram. 7 ref. (M22, Q27)

401-M. (Swedish.) X-Ray Analysis of Carbides in Molybdenum Steel. Kehsin Kuo. *Jernkontorets Annaler,* v. 137, no. 5, 1953, p. 141-148.

Discovery of new Fe-Mo double carbide in steels of 1 to 5% Mo. Carbide reactions and phases in equilibrium at 700° C. Tables, diagrams. 17 ref. (M26, M22, AY)

402-M. (Swedish.) X-Ray and Chemical Analysis of Carbides in Chromium Steel. Kehsin Kuo. *Jernkontorets Annaler,* v. 137, no. 5, 1953, p. 149-156.

Equilibrium diagram for the Fe-Cr-C system below A_1. Reports presence of alpha-Fe, Fe_3C. Cr_7C_3, and $Cr_{23}C_6$. Carbide reactions. Graphs, tables. 21 ref. (M26, M24, AY)

403-M. Application of New Etchants for Delineation of Fine Structure in Steel. A. E. Austin. *American Society for Testing Materials, Preprint* no. 94b, 1953, 5 p.

Comparison of structures of pearlite, bainite and tempered martensite as revealed by various etchants. Micrographs. (M21, ST)

404-M. Positive Versus Negative Plastic Replicas. C. M. Schwartz. *American Society for Testing Materials, Preprint* no. 94c, 1953, 5 p.

Compares the two methods; experimental work on electron microscopy. Micrographs. (M21)

405-M. Techniques for the Study of Precipitated Carbides. W. D. Forgeng and John L. Lamont. *American Society for Testing Materials, Preprint* no. 94d, 1953, 17 p.

Polyvinyl formal method and its modifications. Micrographs. 8 ref. (M21, SS, CN)

406-M. An Introduction to the Electron Theory of Metals. Robert A. Lefever. *Journal of Chemical Education,* c. 30, Oct. 1953, p. 486-490.

General background for understanding metal physics as well as a basis for more advanced study. Diagrams. 14 ref. (M25)

407-M. Alloying Characteristics of Magnesium. John Alico. *Light Metal Age,* v. 11, Oct. 1953, p. 16-17, 24, 26.

Structure of magnesium crystal lattice as it applies to properties of its alloys. Graph, table. (M26, P general, Mg)

408-M. Fractographic Patterns of Segregation. Carl A. Zapffe. *Metallurgia,* v. 48, no. 287, Sept. 1953, p. 130-132.

Fractographic patterns in Zn-Al and Bi-Sb alloys. Micrographs. 6 ref. (M23, In, Bi, Al)

409-M. Color Shows Up the Unknown in Metallography. J. H. Powers and W. J. Loach. *Steel,* v. 133, Oct. 15, 1953, p. 93-96.

Heat tinting as key to color examination of carbide mixtures; reports each constituent and phase can be identified; and new methods for studying structure-property relationship. Photographs. (M23)

410-M. (French.) Polygonized State of a Metal. A. Guinier. *Metaux, Corrosion-Industries,* v. 28, no. 337, Sept. 1953, p. 339-347.

Polygonization as a metastable state preceding recrystallization. Diagrams, micrographs. 14 ref. (M26, N5, Al, Zn, Cu)

411-M. (German.) Effect of Microstructure of Unalloyed Steels on Their Workability. O. Szabo. *Acta Technica Academiae Scientiarum Hungaricae,* v. 6, nos. 3-4, 1953, p. 351-386.

Effect of carbide distribution on strength, workability and hardenability. Tables, graphs, micrographs, photographs. 14 ref. (M27, J26, Q23, CN)

412-M. (German.) Structure of the Zirconium-Silicon System. H. Schachner, H. Nowotny, and R. Machenschalk. *Monatshefte für Chemie,* v. 84, no. 4, 1953, p. 677-685.

X-ray studies revealed presence of $ZrSi_2$, ZrSi, Zr_5Si_3, and Zr_2Si. Tables. 14 ref. (M24, Zr, Si)

413-M. (German.) X-Ray Investigations of the Platinum-Mercury System. E. Bauer, H. Nowotny, and A. Stempfl. *Monatshefte für Chemie,* v. 84, no. 4, Aug. 1953, p. 692-700.

Phases were radiographically investigated over entire concentration range. Tables. 10 ref. (M24, Pt, Hg)

414-M. (German.) Electron Diffraction on Metal Monocrystals up to 1000° C. Chr. Menzel-Kopp and E. Menzel. *Zeitschrift für Naturforschung,* v. 8a, no. 8, Aug. 1953, p. 499-501.

Research arrangement which permits rapid sequence of heating and observation intervals. 11 ref. (M22, Mo, Au, Cu)

415-M. (Russian.) Structure of Martensite Crystals of Hardened Steel. M. P. Arbuzov, L. I. Lysak, and E. G. Nesterenko. *Doklady Akademii Nauk SSSR,* v. 90, no. 3, May 21, 1953, p. 375-377.

X-ray diffraction used to study size and distortions of structural units. Tables, graph. 6 ref. (M22, M26, CN)

416-M. Fast Polishing Method Brings Out Graphite. R. W. Lindsay and J. M. Snook. *American Foundryman,* v. 24, Nov. 1953, p. 48-50.

Cutting specimen, grinding, first and second wet polishing operations and preparation of the chromic oxide abrasive. Micrographs. (M21, CI)

417-M. Modification of High-Silicon Aluminum Alloys and the Corresponding Structures. Claude Mascre. *Institute of British Foundrymen, Paper no.* 1071, 1953, 6 p.

Action of phosphorus and sodium on the structure of hypereutectic aluminum and silicon alloys. Micrographs, diagrams. 6 ref. (M27, Al, Si)

418-M. Recommended Techniques for Polishing Titanium for Metallographic Examination. Roman Osadchuk, William P. Koster and John F. Kahles. *Metal Progress,* v. 64, Oct. 1953, p. 129-131, 236, 240.

Mechanical and electrolytic techniques. (M21, Ti)

419-M. (English.) A Study of Deformed and Recovered Aluminum Crystals by a New X-Ray Technique. C. A. Julien and B. D. Cullity. *Acta Metallurgica,* v. 1, no. 5, Sept. 1953, p. 588-597.

Method of detecting and measuring torsional strain in a crystal lattice. Plastic deformation was found to be inhomogeneous and reversible in aluminum single crystals. Diagrams, photographs. 13 ref. (M26, Q24, Al)

420-M. (English.) On a Statement by C. S. Smith Concerning an Upper Limit to the Sharing of Corners in Aggregates. J. L. Meijering. *Acta Metallurgica,* v. 1, no. 5, Sept. 1953, p. 607.

Author reasons that the ratio of corners to number of crystals can be more than six. (M26)

421-M. (English.) The High Temperature Hexagonal Phase of Cobalt. A. G. Metcalfe. *Acta Metallurgica,* v. 1, no. 5, Sept. 1953, p. 609-610.

Previously published data used to indicate that grain size may be very significant in transformation studies. Graph. 6 ref. (M27, N6, Co)

422-M. (English.) A "Sub-Regular" Solution Model Applied to the Immiscibility Curve in Liquid Lead-Zinc Alloys. H. K. Hardy. *Acta Metallurgica,* v. 1, no. 5, Sept. 1953, p. 610-611.

Shows that only one empirical constant is required for this calculation. Graphs. 4 ref. (M24, Pb, Zn)

423-M. (English.) Triple η_2 Carbides and the Atomic Size Factor. Kehsin Kuo. *Acta Metallurgica,* v. 1, no. 5, Sept. 1953, p. 611-612.

Experimental data show the existence of three triple carbides in Ti-Ni-Ta-C, Ti-Co-Ta-C, and Ti-Ni-Nb-C alloys. 4 ref. (M25, M27, Ti)

424-M. (French.) Recording Methods in Electron Microscopy. R. Dargent. *Metaux. Corrosion-Industries,* v. 28, nos. 335-336, July-Aug. 1953, p. 285-292.

Various methods, and a method yielding a double record. Micrographs. 12 ref. (M21, Al, Cr)

425-M. (German.) The Splitting of Dislocations in Metals With Close-Packed Lattices. A. Seeger and G. Schöck. *Acta Metallurgica,* v. 1, no. 5, Sept. 1953, p. 519-530.

Elastic properties of straight dislocation lines and splitting of half-dislocations in closest-packed lattice planes. Numerical results for copper, aluminum and cobalt. Tables. 18 ref. (M26, Cu, Al, Co)

426-M. (German.) Field Electron Microscopic Observations on Cathodes

With Cubic Body-Centered and Cubic Face-Centered Lattice Structure. H. Birkenshenkel, R. Haefer and P. Mezger. *Acta Physica Austriaca*, v. 7, no. 4, 1953, p. 402-416.

Tungsten-cathode method for investigating Mo, Ta and Ni. Diffraction patterns, diagrams, tables. 18 ref. (M26, M22, Mo, Ta, Ni)

427-M. (German.) **Magnetic Measuring in Metallography.** W. Jellinghaus. *Metall*, v. 7, nos. 17-18, Sept. 1953, p. 669-678.

Survey of ferromagnetic crystal types; application of ferromagnetic methods to studying structures, textures and deformation processes; paramagnetic and diamagnetic substances; and measuring devices and processes. Graphs, diagrams. 39 ref. (M23, Q24, P16, Fe, Al, Co, Pt, Ni)

428-M. (German.) **Crystal Structure of Mn_5Ge_3 and Several Ternary Phases With Two Transition Elements.** L. Castelliz. *Monatshefte für Chemie*, v. 84, no. 4, 1953, p. 765-776.

Results of X-ray studies of various binary and ternary alloys of germanium, tin and antimony. Tables. 9 ref. (M26, M22, Ge, Sn, Sb)

429-M. (German.) **Nature and Properties of Grain Boundaries of Polycrystalline Metallic Substances.** Kurt Lücke. *Zeitschrift für Metallkunde*, v. 44, no. 8, Aug. 1953, p. 370-378.

Plasticity and anelasticity. Experimental study of grain-boundary energy. Photographs, graphs, diagrams, tables. 42 ref. (M27, Q22, Fe, Al, Zn)

430-M. (German.) **Recognition of Nickel-Carbon-Magnesium System.** Erich Scheil and Leo Hütter. *Zeitschrift für Metallkunde*, v. 44, no. 8, Aug. 1953, p. 387-389.

System as ternary carbide of cubically face-centered lattice. Occurence of quadruple-phase equilibria. Graphs, micrographs. (M24, Ni, Mg)

431-M. (German.) **The Decomposition of the Hexagonal Aluminum Boride AlB_2.** Franz Lihl and Peter Jenitschek. *Zeitschrift für Metallkunde*, v. 44, no. 9, Sept. 1953, p. 414-417.

Method of preparing aluminum-boron alloys, metallographic study of aluminum-boron alloys with aluminum boride inclusions, and X-ray study of aluminum boride decomposition and its effect on the alloys. Micrographs. 7 ref. (M27, Al, B)

432-M. (German.) **Nature and Properties of the Grain Boundaries of Polycrystalline Metals. Review of Recent Work.** Kurt Lücke. *Zeitschrift für Metallkunde*, v. 44, no. 9, Sept. 1953, p. 418-426.

General theory of grain boundaries, grain boundary diffusion and some structural peculiarities caused by surface energy. Diagrams, graphs, micrographs. 28 ref. (M27, N3, Ag, Cu)

433-M. (German.) **A Macrostructure of Amorphous Selenium.** Joachim Weber. *Zeitschrift für Naturforschung*, v. 8a, no. 9, Sept. 1953, p. 565-566.

Conditions under which crystalline structures were induced. Diagram, photographs. (M28, M26, Se)

434-M. (Russian.) **Dispersion of X-Rays by Metals in the Region of Very Small Angles.** B. M. Rovinskii and V. M. Genkin. *Doklady Akademii Nauk SSSR*, v. 89, no. 4, Apr. 1953, p. 673-675.

Dispersion by pure metals. Graphs. 6 ref. (M22)

435-M. (Book.) **Alphabetical and Grouped Numerical Index of X-Ray Diffraction Data.** 441 p. 1950. American Society for Testing Materials, 1916 Race St., Philadelphia 3, Pa. (M22)

N

Transformations and Resulting Structures

274-N. Transformation Kinetics and Mechanical Properties of Titanium-Aluminum-Molybdenum Alloys. H. D. Kessler and M. Hansen. *American Society for Metals, Preprint* no. 5, 1953, 22 p.

End-quench hardenability, time-temperature - transformation, age hardening and mechanical properties. Tables, graphs, micrographs. 13 ref. (N9, J26, J27, Q general, Ti, Al, Mo)

275-N. Transformation Kinetics and Mechanical Properties of Titanium-Aluminum-Chromium Alloys. H. D. Kessler and M. Hansen. *American Society for Metals, Preprint* no. 6, 1953, 28 p.

End-quench hardenability, time-temperature - transformation, age hardening, and mechanical properties were studied. Tables, graphs, micrographs. 5 ref. (N9, J26, J27, Q general, Ti, Al, Cr)

276-N. A Time-Temperature Relationship for Recrystallization and Grain Growth. F. R. Larson and J. Salmas. *American Society for Metals, Preprint* no. 10, 1953, 22 p.

A parameter which evaluates relative effects of time and temperature was applied to recrystallization and grain growth. Tables, graphs. 21 ref. (N5, N3, Cu, Zr, Al, Ni, Fe, Mn)

277-N. Effect of Nonmartensite Decomposition Products on the Properties of Quenched and Tempered Steels. E. F. Bailey. *American Society for Metals, Preprint* no. 11, 1953, 18 p.

Times necessary for 10 and 30% decomposition to ferrite, pearlite and bainite in AISI 1340 and 5140 were determined using Charpy bar-size specimens quenched into isothermal baths. Tables, graphs, micrographs. 8 ref. (N8, Q general, AY)

278-N. Supercooling and Dendritic Freezing in Alloys. W. C. Winegard and B. Chalmers. *American Society for Metals, Preprint* no. 16, 1953, 10 p.

Supercooling may result from enrichment in solute of the liquid immediately ahead of the advancing solid-liquid interface. Graphs, diagrams. 10 ref. (N12, Cu, Sn)

279-N. Elevation of Critical Temperatures in Steel by High Heating Rates. W. J. Feuerstein and W. K. Smith. *American Society for Metals, Preprint* no. 19, 1953. 12 p.

Ac_1 and Ac_3 critical temperature determined for AISI 1020, 1042, 1080 and 4130 steels in the annealed condition. Table, graphs, diagram. 6 ref. (N8, J23, AY)

280-N. A Hypothesis for the Boron Hardenability Mechanism. J. W. Spretnak and Rudolph Speiser. *American Society for Metals, Preprint* no. 20, 1953, 32 p.

Importance of the allotropic transformation in determining kinetics of decomposition of austenite. Tables, graphs. 37 ref. (N6, N8, AY)

281-N. Microstructural Changes on Tempering Iron-Carbon Alloys. B. S. Lement, B. L. Averbach, and Morris Cohen. *American Society for Metals, Preprint* no. 25, 1953, 27 p.

Electron microscopic study of microstructural changes that occur in high purity Fe-C alloys during tempering up to 700° F. Tables, graphs, micrographs. (N8, J29, Fe)

282-N. Gamma Loop Studies in the Iron-Vanadium and the Iron-Vanadium-Titanium Systems. William R. Lucas and W. P. Fishel. *American Society for Metals, Preprint* no. 30, 1953, 13 p.

Dilatation studies to determine the Ac_3 transformation temperatures. Tables, graphs, photograph. 9 ref. (N8, Fe, V, Ti)

283-N. High Temperature Transformations in Ferritic Stainless Steels Containing 17 to 25% Chromium. A. E. Nehrenberg and Peter Lillys. *American Society for Metals, Preprint* no. 31, 1953, 28 p.

Studies of complex isothermal transformations which occur in both austenite and delta ferrite of commercial 17, 21 and 25% Cr steels heated sufficiently for complete solution of carbides. Table, graph, micrographs. 21 ref. (N8, SS)

284-N. Grain Growth in High Speed Steel. Eric Kula and Morris Cohen. *American Society for Metals, Preprint* no. 33, 1953, 26 p.

Formation of fish-scale fracture during re-austenizing of previously hardened steels. Graphs, micrographs. 23 ref. (N3, TS)

285-N. Discontinuous Grain Growth in High Speed Steel. Arthur H. Grobe, George A. Roberts, and D. S. Chambers. *American Society for Metals, Preprint* no. 34, 1953, 30 p.

Fish-scale fracture formation in eight commercial high speed steels. Tables, graphs, micrographs. 4 ref. (N3, TS)

286-N. Strain Aging Behavior of Rheotropically Embrittled Steel. E. J. Ripling. *American Society for Metals, Preprint* no. 35, 1953, 11 p.

Rheotropic recovery produced in a steel heat treated to a high-hardness level is shown to persist through a second tempering treatment. Graphs. 9 ref. (N4, Q23, AY)

287-N. Solution and Precipitation of Aluminum Nitride in Relation to the Structure of Low Carbon Steels. W. C. Leslie, R. L. Rickett, C. L. Dotson, and C. S. Walton. *American Society for Metals, Preprint* no. 1W, 1953, 28 p.

Temperature required for complete solution was investigated. Effects of composition, solution temperature and prior cold work on rate of isothermal precipitation. Influence of aluminum nitride on microstructure of cold rolled, box annealed sheet steel. Tables, graphs, micrographs. 12 ref. (N7, M27, CN)

288-N. Roles of Aluminum and Nitrogen in Graphitization. E. J. Dulis and G. V. Smith. *American Society for Metals, Preprint* no. 2W, 1953, 11 p.

Results of tests on cementite decomposition of eight steels. Tables, micrographs. 6 ref. (N8, CN, Al)

289-N. The Influence of Heat Treating Variables on the Martensite Transformation in SAE 1050 Steel. Melvin R. Meyerson and Samuel J. Rosenberg. *American Society for Metals, Preprint* no. 8W, 1953. 26 p.

Effects of austenitizing temperature, austenite grain size and rate of cooling. Tables, graphs, micrographs. 32 ref. (N8, CN)

290-N. The Formation of Sigma Phase in Types 309 and 310 Stainless Steel. R. C. Frerichs and C. L. Clark. *American Society for Metals, Preprint* no. 9W, 1953. 12 p.

Structural and physical changes occurring as a result of aging at elevated temperatures. Micrographs, table, diagrams. 9 ref. (N7, N8, SS)

291-N. Precipitation Hardening in Austenitic Chromium-Nickel Steels Containing High Carbon and Phosphorus. A. G. Allten, J. G. Y. Chow.

and A. Simon. *American Society for Metals, Preprint* no. 10W, 1953, 25 p.

Series of 21% Cr, 12% Ni steels containing 0.3 to 0.7% C and 0.03 to 0.5% P were studied by hardness, X-ray diffraction, electrical resistivity and metallographic methods. Tables, graphs, micrographs. 18 ref. (N7, SS)

292-N. Heat Treatment of Steel Castings. John Howe Hall. *Foundry*, v. 81, Oct. 1953, p. 122-125, 264-265.

Changes which occur in metal structure that improve mechanical properties during heat treating. Micrographs, photographs, graph. 3 ref. (To be continued.)
(N general, J general, Q general, CI)

293-N. Growth Characteristics of Ingot-Mould Irons in Air and Vacuum. J. W. Grant. *Foundry Trade Journal*, v. 95, Sept. 17, 1953, p. 359-361; disc., p. 361-362.

Tests which establish that appreciable growth can take place in cast iron even in absence of oxidizing influences and gases. (N8, CI)

294-N. Growth of Single Crystals From a Melt. *Metal Industry*, v. 83, Sept. 18, 1953, p. 242.

Bridgeman method. Influence of temperature gradient and rate of growth on quality of single crystals of Bi, Pb, Sn, and Zn. 2 ref.
(N12, Sn, Pb, Zn Bi)

295-N. (French.) **Contribution to the Study of the Supersaturation of Iron by Cathodic Hydrogen.** Jean DuFlot. *Publications Scientifiques et Techniques du Ministere de l'Aire*, Paris, no. 265, 1952, 58 p.

Thorough study covering experimental conditions, role of Fe structure in cathodic charging, mechanical tests, and measurements. 42 ref. (N15, Fe)

296-N. (French.) **Diffusion of Metals Into Thin Layers Which are Obtained by Vaporization.** Pierre Michel. *Comptes rendus*, v. 237, no. 4, July 27, 1953, p. 332-333.

Formation of Ag-Sn and Ag-Zn alloys by successive vaporizations. Ag-Mg and Ag-Cu alloys could not be formed by this method. Table. 4 ref.
(N1, Ag, Sn, Zn, Mg, Cu)

297-N. (French.) **Anomalies Observed in Recrystallization of Sheets and Tubes of Copper Alloys Containing Aluminum.** J. Marechal and M. Doucet. *Revue de metallurgie*, v. 50, no. 8, Aug. 1953, p. 537-550.

Reduction in grain size between 400 and 600° C. Graphs, micrographs. (N5, Cu, Al)

298-N. (French.) **Thermo-Elastic Study and Isothermal Decomposition of Eutectoid in Aluminum Bronzes.** Rene Le Roux. *Revue de metallurgie*, v. 50, no. 8, Aug. 1953, p. 558-578.

Pearlitic, martensitic and order-disorder transformations by measurements of variations in elastic modulus during continuous cooling. Tables, graphs, micrographs, diagrams. 31 ref. (N9, N10, Cu, Al)

299-N. (German.) **Segregation Phenomena in Nickel Steels.** Klaus Janssen, Eduard Houdremont, and Werner Jellinghaus. *Archiv fur das Eisenhüttenwessen*, v. 24, nos. 7-8, July-Aug. 1953, p. 323-332.

Examples of solid-state segregation. Graphs, photographs, table. 8 ref. (N12, AY)

300-N. (German.) **Isothermal Time-Temperature Diagrams of Useful Tool Steels.** Max Kroneis, Reinhold Gattringer, Kurt Ebner, and Helmut Krainer. *Archiv fur das Eisenhüttenwesen*, v. 24, nos. 7-8, July-Aug. 1953, p. 333-351.

Diagrams for 24 alloy steels. Diagrams, graphs, table. (N8, TS)

301-N. (German.) **Influence of State of Material on Hydrogen Diffusion in Unalloyed Steel.** Hermann Schumann and Friedrich Erdmann-Jesnitzer. *Archiv fur das Eisenhüttenwesen*, v. 24, nos. 7-8, July-Aug. 1953, p. 353-360.

Influence of varying degrees of cold deformation and recrystallization on behavior of H_2 in low C steel. Photographs, graphs, diagrams, table. 23 ref. (N1, N5, ST)

302-N. S-Curves. E. Gillam and D. G. Cole. *Iron & Steel*, v. 26, Oct. 1953, p. 471-474.

Development of X-ray method to follow submartensitic transformations in steels. Diagrams, graphs, tables. 11 ref. (N8, ST)

303-N. Can I Benefit From the Use of Low Temperature Treatment? Howard E. Boyer. *Steel Processing*, v. 34, Oct. 1953, p. 502-508.

Low-temperature austenite transformations in steels. Tables, graphs, photographs. (N8, J2, ST)

304-N. (German.) **Recrystallization Textures of Titanium.** D. N. Williams and D. S. Eppelsheimer. *Zeitschrift für Metallkunde*, v. 44, no. 8, Aug. 1953, p. 360-362.

Textures resulting from heating pure cold rolled titanium to 800° C. and commercial cold rolled titanium to 650, 800 and 880° C. Diagrams, tables. 6 ref. (N5, Ti)

305-N. (German.) **Thermodynamics of the Transfer Processes in Ionic Mixtures and Their Application on Isotope-Containing Salts and Metals.** Alfred Klemm. *Zeitschrift für Naturforschung*, v. 8a, no. 7, July 1953, p. 397-400.

Relationship between conductivity, cationic and anionic self diffusion, and the mass effect of electrolytic migration. 4 ref. (N1)

306-N. (German.) **Self-Diffusion of Thallium in Molten Thallium Chloride.** E. Berne and A. Klemm. *Zeitschrift für Naturforschung*, v. 8a, no. 7, July 1953, p. 400-403.

Experimental method of measuring self-diffusion coefficients. Diagram, table, graph. (N1, Tl)

307-N. (English.) **The Growth of Strain-Anneal Crystals of Predetermined Orientation.** G. K. Williamson and R. E. Smallman. *Acta Metallurgica*, v. 1, no. 5, Sept. 1953, p. 487-491.

Principles and method of growing crystals of any desired orientation in superpure aluminum and its alloys. Diagrams. 16 ref. (N12, Al)

308-N. (English.) **Self-Diffusion in Zinc.** G. A. Shirn, E. S. Wajda, and H. B. Huntington. *Acta Metallurgica*, v. 1, no. 5, Sept. 1953, p. 513-518.

Radioactive zinc was used as a tracer. It is shown that at least two mechanisms are involved. Graphs, tables. 5 ref. (N1, Zn)

309-N. (English.) **Criterion for the Action of Applied Stress in the Martensitic Transformation.** J. R. Patel and M. Cohen. *Acta Metallurgica*, v. 1, no. 5, Sept. 1953, p. 531-538.

Effects of stress on the transformation temperature were studied experimentally for iron-nickel and iron-nickel-carbon alloys under uniaxial tension, uniaxial compression and hydrostatic pressure. Table, graphs. 13 ref.
(N8, Q25, Fe, Ni, C)

310-N. (English.) **The Effects of Neutron Irradiation in the NRX Reactor on the Order-Disorder Alloy Cu_3Au.** L. G. Cook and R. L. Cushing. *Acta Metallurgica*, v. 1, no. 5, Sept. 1953, p. 539-548.

Volume disordering was observed with fission spectrum neutrons and a secondary ordering effect was apparently induced by thermal neutrons. Tables, graphs, diagrams. 10 ref. (N10, Cu, Au)

311-N. (English.) **The Effects of Neutron Irradiation in the NRX Reactor on the Order-Disorder Alloy CuAu.** L. G. Cook and R. L. Cushing. *Acta Metallurgica*, v. 1, no. 5, Sept. 1953, p. 549-551.

Disordering was caused by fast neutrons. Thermal neutrons apparently caused secondary ordering. Tables, graphs. (N10, Cu, Au)

312-N. (English.) **An X-Ray Investigation of Age Hardening in AlAg.** C. B. Walker and A. Guinier. *Acta Metallurgica*, v. 1, no. 5, Sept. 1953, p. 568-577.

Experimental data confirm Guinier's explanation of the precipitation mechanism for a 20% Ag-Al alloy. Graphs, diagrams. 17 ref.
(N7, Al, Ag)

313-N. (English.) **The Diffusivity of Carbon in Iron by the Steady-State Method.** R. P. Smith. *Acta Metallurgica*, v. 1, no. 5, Sept. 1953, p. 578-587.

Tests were made at 1000, 851 and 802° C. with different carbon contents at the cylinder surfaces. Diagrams, tables, charts. 22 ref.
(N1, Fe, C)

314-N. (German.) **The Kinetics of AuCu and $AuCu_3$.** U. Dehlinger. *Acta Metallurgica*, v. 1, no. 5, Sept. 1953, p. 492-494.

The lower rate of disorder-order transformation in deformed crystals is explained as a function of the number of atoms in a stable nucleus. 6 ref. (N10, Au, Cu)

315-N. (German.) **Metallographic Investigations of Electrolylic Chromium Deposits.** L. Koch and G. Hein. *Metalloberfläche*, Ausgabe A, v. 7 no. 10, Oct. 1953, p. 145-148.

Hexagonal beta modifications changing to cubic modifications upon heating to room temperature or storing for prolonged periods. Micrographs, tables. 10 ref.
(N6, Cr, Cu, ST)

316-N. (Russian.) **Nonuniform Crystallization During Welding.** S. V. Avakian, N. F. Lashko, and O. P. Shlykov. *Avtogennoe Delo*, v. 24, no. 6, June 1953, p. 12-16.

Effects of cooling Al-Cu and Al-Si systems at different rates. Graphs, micrographs.
(N12, K general, Al, Cu, Si)

317-N. (Russian.) **Effect of Certain Dissolved Additions on the Frontal Diffusion of Silver in Polycrystalline Copper.** V. I. Arkharov, S. I. Ivanovskaia, and N. N. Skorniakov. *Doklady Akademii Nauk SSSR*, v. 89, no. 4, Apr. 1953, p. 669-672.

Effect of small additions of iron. Micrographs, table. (N1, Cr, Ag)

318-N. (Russian.) **Thermodynamics of Simple Carbides in Steel.** N. S. Fastov and B. N. Finkel'shtein. *Doklady Akademii Nauk SSSR*, v. 89, no. 4, Apr. 1953, p. 677-679.

Quantity and composition of carbide phase depending on composition of the steel and its thermal treatment. (N8, M27, ST)

P
Physical Properties and Test Methods

489-P. Aluminium and Alloys. Properties of Materials. F. R. Barnett. *Australasian Engineer*, 1953, Feb., p. 58-65.

Mechanical, physical, and corrosion properties. Tables, photographs, graphs. (P general, Q general, R general, Al)

490-P. The Anodic Behaviour of Copper in Neutral and Alkaline Chloride Solutions. H. Lal and H. R. Thirsk. *Chemical Society, Journal,* 1953, Sept., p. 2638-2644.

Conditions under which the metal passes into solution, nature of oxide or salt deposited on anode, and effect of increasing alkalinity. Graphs. (P13, Cu)

491-P. On the Thermal Conversion of Germanium. F. van der Maesen, P. Penning, and A. van Wieringen. *Philips Research Reports,* v. 8, Aug. 1953, p. 241-244.

Experiments on conversion of *n*-type Ge into *p*-type by heat treatment at 800° C. Photographs. 6 ref. (P15, Ge)

492-P. Photoelectromagnetic and Photodiffusion Effects in Germanium. T. S. Moss, L. Pincherle, and A. M. Woodward. *Physical Society, Proceedings,* v. 66, no. 405B, Sept. 1953, p. 743-752.

Experimental data. Graphs. 7 ref. (P16, Ge)

493-P. Thermal Conductivity of Silver at Low Temperatures. G. K. White. *Physical Society, Proceedings,* v. 66, no. 405A, Sept. 1953, p. 844-845.

Tests were made between 2 and 160° K. Graphs. 5 ref. (P11, Ag)

494-P. Thermo-Electricity at Low Temperatures. I. The 'Ideal' Metals: Sodium, Potassium, Copper. D. K. C. MacDonald and W. B. Pearson. *Royal Society, Proceedings,* v. 219, ser. A, Sept. 22, 1953, p. 373-387.

Electron theory of metals. Experimental data. Diagrams, graphs, table. 33 ref. (P15, Na, K, Cu)

495-P. (French.) **Measuring the Variation of Free Energy of a Metal During Cold-Hardening.** Roger Jouty. *Comptes rendus,* v. 237, no. 9, Aug. 31, 1953, p. 488-489.

Electrochemical method. Experimental details. (P12)

496-P. (German.) **Thermal Effects of Metallurgical Reactions.** Carl V. Schwarz. *Archiv für das Eisenhüttenwesen,* v. 24, nos. 7-8, July-Aug. 1953, p. 285-306.

Heats of formation of 644 compounds encountered in metallurgical processes. Tables. 7 ref. (P12)

497-P. (Russian.) **Dependence of Compressibility of Elements on the Atomic Number.** L. F. Vereshchagin and A. I. Likhter. *Doklady Akademii Nauk SSSR,* v. 86, new ser. no. 4, Oct. 1, 1952, p. 745-747.

Graphs for compressibility of nearly all elements at 1 atm., 30,000 kg. per cm.^{2}, and 10,000 kg. per cm.^{3}. (P10)

498-P. Growth Characteristics of Ingot-Mould Irons in Air and Vacuum. J. W. Grant. *Institute of British Foundrymen, Paper no.* 1063, 1953, 19 p.

Theories of growth of cast iron. Air annealing halted growth due to repeated heating in vacuum. Graphs, micrographs, tables. 24 ref. (P10, J23, CI)

499-P. Brillouin Zone Investigation of Mg Alloys. I. Hall Effect and Conductivity. A. I. Schindler and E. I. Salkovitz. *Physical Review,* v. 91, ser. 2, Sept. 15, 1953, p. 1320-1322.

Familiar conductivity rules for alloys in the light of Jones theory. Deviations from these rules to be expected for alloys of divalent hexagonal metals. Diagrams, graphs. 6 ref. (P15, Mg, Al, Ag)

500-P. Absorption of Infrared Light by Free Carriers in Germanium. H. B. Briggs and R. C. Fletcher. *Physical Review,* v. 91, ser. 2, Sept. 15, 1953, p. 1342-1346.

Measurements of above by injecting these carriers across *p-n* junction at room temperature. Diagrams, graphs. 13 ref. (P15, Ge)

501-P. The Atomic Heat of Germanium Below 4° K. P. H. Keesom and N. Pearlman. *Physical Review,* v. 91, ser. 2, Sept. 15, 1953, p. 1347-1353.

Measurements with pure polycrystalline and single crystal ingots, indium and antimony doped single crystal ingots, and pure crushed material. Diagram, tables, graph. 26 ref. (P12, Ge)

502-P. The Hall Effect in Yttrium, Lanthanum, Cerium, Praseodymium, Neodymium, Gadolinum, Dysprosium, and Erbium. C. J. Kevane, S. Legvold and F. H. Spedding. *Physical Review,* v. 91, ser. 2, Sept. 15, 1953, p. 1372-1379.

Tables, diagrams, graphs. 24 ref. (P15, Y, La, Ce, Pr, Nd, Gd, Dy, Er)

503-P. (German.) **Thermal Stressing of Tellurium Metal (Research on Suitability of Tellurium-Metallic Compositions for Thermo-Elements of Low Inactivity).** G. C. Mönch. *Annalen der Physik,* v. 12, nos. 4-6, July 1953, p. 161-174.

Results of measurements of sensitivity, time constants, and vacuum factor in thermo-elements of various Te alloys. Destructive diffusion of Ag in Te. Diagrams, tables. 2 ref. (P15, N1, Te, Ag)

504-P. (German.) **Thermal Stressing Tellurium-Silver (Research on Peculiarities of Tellurium-Silver Thermo-Elements).** Th. Mohr. *Annalen der Physik,* v. 12, nos. 4-6, July 1953, p. 175-182.

Infusion of Ag into Te causes lowering of resistance and formation of additional, secondary, movable soldering point. Lattice processes in pure Te effected a rise of resistance in the elements. Diagrams, tables. 3 ref. (P15, N11, Te, Ag)

505-P. (German.) **Decomposition of Mg^{27}.** H. Daniel, L. Koester and T. Mayer-Kuckuk. *Zeitschrift für Naturforschung,* v. 8a, no. 7, July 1953, p. 447-448.

Three methods of investigation by measuring emission of beta and gamma rays. 10 ref. (P13, Mg)

506-P. (German.) **Electrical Properties of InSb.** H. Weiss. *Zeitschrift für Naturforschung,* v. 8a, no. 8, Aug. 1953, p. 463-469.

Measurements of conductivity, Hall effect and magnetic resistance change. Graphs, diagrams. 8 ref. (P15, In, Sb)

507-P. Semiconducting Intermetallic Compounds. *National Bureau of Standards, Technical News Bulletin,* v. 37, Nov. 1953, p. 174-175.

Recent work on Hall effect and conductivity in GaSb, AlSb, CdSb and InSb. Photographs. (P15, Ga, Sb, Al, Cd, In)

508-P. The Energy Band Structure of a Linear Metal. E. P. Wohlfarth. *Physical Society, Proceedings,* v. 66, no. 406A, Oct. 1953, p. 889-893.

A tight binding calculation of the one-electron energy as a function of wave number for a linear chain of hydrogen atoms in the ground state. 12 ref. (P10)

509-P. (English.) **The Low Temperature of Specific Heat of Antimony.** W. DeSorbo. *Acta Metallurgica,* v. 1, no. 5, Sept. 1953, p. 503-507.

Measurements were made from 13 to 70° K. Data compared to calculated values. Tables, graphs. 16 ref. (P12, Sb)

510-P. (English.) **Relation Between Plastic Strain and Increase of Electrical Resistivity of Metals.** H. G. van Bueren. *Acta Metallurgica,* v. 1, no. 5, Sept. 1953, p. 607-609.

Experimental data indicate that vacancies and interstitial atoms are more effective than dislocations in causing increased resistivity of copper, silver and gold. 6 ref. (P15, Q24, Cu, Ag, Au)

511-P. (Russian.) **Measurement of the Melting Point of Metals at Superhigh Pressures.** V. P. Butuzov, M. G. Gonikberg, and S. P. Simrnov. *Doklady Akademii Nauk SSSR,* v. 89, no. 4, Apr. 1953, p. 651-653.

Methods for measuring temperatures higher than 200° C. Diagram, graph, table. 6 ref. (P12)

512-P. (Book.) **Reports on Progress in Physics. V. XV.** A. C. Strickland, editor. 338 p. 1952. Physical Society, Lowther Gardens, Prince Consort Road, London S.W. 7, England.

Includes "The Hydrogen Bond", L. Kellner; "Mass Spectrometry", K. I. Mayne; "Range Energy Relations", A. E. Taylor; "The Analysis of High Energy Neutron-Proton and Proton-Proton Scattering Data", R. S. Christian; "Turbulent Motion", G. K. Batchelor; "Ferrites", A. Fairweather, F. F. Roberts, A. J. E. Welch; "The Band Structure of Metals", G. V. Raynor; "Galvanomagnetic Effects in Conductors", D. K. C. Mac Donald and K. Sarginson; and "Traveling Wave Tubes", R. Kompfner. (P general, M27)

513-P. (Book.) **Survey Characteristics, and Evaluation of High-Performance Magnetic Core Materials.** Wright Air Development Center, U.S.A.F. 1952. 44 p. Office of Technical Services, U. S. Department of Commerce, Washington 25, D. C. $1.50.

Reports survey of several high-performance magnetic core materials as an aid in evaluating and comparing materials possessing wide frequency and flux density ranges, but differing greatly in other characteristics. (P16)

Q
Mechanical Properties and Test Methods; Deformation

959-Q. Determination of Strains Between Enamel and Iron by Means of Split Rings. J. D. Walton, Jr. and B. J. Sweo. *American Ceramic Society, Journal,* v. 36, Oct. 1953, p. 335-341.

Apparatus used and method of determining strains. Graphs, diagrams, photographs, table. (Q25, L27)

960-Q. Correlation Between Heat Treatment, Microstructure and Mechanical Properties of Titanium-Molybdenum Alloys. D. J. DeLazaro and W. Rostoker. *American Society for Metals, Preprint* no. 8, 1953, 18 p.

Tensile and impact properties obtained for a wide range of time and temperature combinations of isothermal transformation. Tables, graphs, micrographs. (Q23, N8, J general, Ti, Mo)

961-Q. Transverse Mechanical Properties of Slack-Quenched and Tempered Wrought Steel. John Vajda and Paul E. Busby. *American Society for Metals, Preprint* no. 9, 1953, 25 p.

Method for developing reproducible slack-quenched structures in heavy steel sections. Tables, graphs, micrographs. 12 ref. (Q general, J26, ST)

962-Q. The Effect of Inclusions on the Fatigue Strength of SAE 4340 Steels. J. T. Ransom. *American Society for Metals, Preprint* no. 12, 1953, 10 p.

Nonmetallic inclusions as a source of fatigue weakness in forged machine elements. Tables, micrographs. (Q7, AY)

963-Q. Observations on the Behavior of Hydrogen in Zirconium. C. M.

Schwartz and M. W. Mallett. *American Society for Metals, Preprint* no. 14, 1953, 13 p.

Embrittling effects of H in Zr. Tables, graphs, micrographs. 6 ref. (Q23, N15, Zr)

964-Q. Recrystallization Applied to Control of the Mechanical Properties of Molybdenum. J. H. Bechtold. *American Society for Metals, Preprint* no. 15, 1953, 17 p.

Mechanical properties of Mo related to microstructure developed by prior mechanical and thermal history. Tables, graphs, micrographs. 7 ref.
(Q general, N5, M27, Mo)

965-Q. The Effect of Pearlite Spacing on Transition Temperature of Steel at Four Carbon Levels. John A. Rinebolt. *American Society for Metals, Preprint* no. 18, 1953, 11 p.

Ductile-brittle transition shown by impact, tensile and hardness properties. Tables, graphs, micrographs. 7 ref. (Q6, Q23, Q29, CN)

966-Q. The Effect of Boron on Notch Toughness and Temper Embrittlement. A. E. Powers and R. G. Carlson. *American Society for Metals, Preprint* no. 21, 1953, 11 p.

Isothermal embrittlement curves constructed for two Mn steels having identical base composition but differing in B content. Tables, graphs, micrographs. 6 ref.
(Q23, AY)

967-Q. Effect of Chemical Composition on Susceptibility of Steels to Temper Brittleness. Ralph Hultgren and John Chuan Chang. *American Society for Metals, Preprint* no. 26, 1953, 14 p.

Studies on high-purity alloys prepared by melting together the constituent elements under He. Tables, graphs. 9 ref. (Q23, AY)

968-Q. The Embrittlement of Alloy Steel at High Strength Levels. L. J. Klingler, W. J. Barnett, R. P. Frohmberg, and A. R. Troiano. *American Society for Metals, Preprint* no. 27, 1953, 33 p.

Three methods of minimizing embrittlement occurring during tempering of quenched steels. Tables, graphs. 41 ref. (Q23, J29, AY)

969-Q. Flow and Fracture of Single Crystals of High Purity Ferrite. R. P. Steijn and R. M. Brick. *American Society for Metals, Preprint* no. 36, 1953, 37 p.

Flow and fracture studies on single crystals of two high-purity Ti ferrites and one high-purity Fe-C alloy. Tables, graphs, diagrams. 16 ref. (Q24, Q26, Fe)

970-Q. Notch-Bar Tensile Properties of Various Materials and Their Relation to the Unnotch Flow Curve and Notch Sharpness. Harry Schwartzbart and W. F. Brown, Jr. *American Society for Metals, Preprint* no. 37, 1953, 24 p.

Effects of strain hardening characteristics and notch sharpness on notch tensile properties. Table, diagram, graphs. 11 ref. (Q23, Cu, Ti)

971-Q. Effect of Some Solid Solution Alloying Elements on the Creep Parameters of Nickel. Thomas H. Hazlett and Earl R. Parker. *American Society for Metals, Preprint* no. 38, 1953, 15 p.

Constant-stress creep studies on four series of solid solution Ni alloys. Graphs, tables. 6 ref.
(Q3, Ni)

972-Q. Effect of Grain Size and Carbon Content on the Low Temperature Tensile Properties of High Purity Fe-C Alloys. R. L. Smith, G. Spangler, and R. M. Brick. *American Society for Metals, Preprint* no. 3W, 1953, 25 p.

Several low-C ferrites were prepared and tested in tension under various conditions of heat treatment, ferrite grain size, and test temperature. Graphs, tables, micrographs. 30 ref. (Q23, Fe)

973-Q. The Substitution of Manganese for Nickel in 16-25-6 Alloy. Wells E. Ellis and Martin Fleischmann. *American Society for Metals, Preprint* no. 11W, 1953, 15 p.

Mechanical properties, precipitation hardening data and microstructural characteristics of a modified Timken 16-25-6 alloy. Tables, graphs, micrographs.
(Q general, J27, M27, AY)

974-Q. Work Softening of 16-25-6 Alloy at Elevated Temperatures. Douglas A. J. Millar and John Wulff. *American Society for Metals, Preprint* no. 12W, 1953, 10 p.

True stress-true strain curves for Timken alloy 16-25-6. Graphs, micrographs. 17 ref. (Q27, AY)

975-Q. Effect of Grain Size on High Temperature Fatigue Properties. J. E. Breen and J. R. Lane. *American Society for Metals, Preprint* no. 13W, 16 p.

Tensile-fatigue and stress rupture tests on alpha brass between 550 and 1000° F. and at room temperature. Tables, graphs, micrographs. 8 ref. (Q7, Cu)

976-Q. Mechanical Anisotropy in Copper. W. A. Backofen, A. J. Shaler and B. B. Hundy. *American Society for Metals, Preprint* no. 14W, 1953, 21 p.

A fibrous structure of flaws having characteristics of cracks was found in Cu specimens varying in purity and processing history. Tables, graphs, macrographs. 22 ref. (Q24, Cu)

977-Q. Effect of Prestrain Histories on the Creep and Tensile Properties of Aluminum. Oleg D. Sherby, Alfred Goldberg, and John E. Dorn. *American Society for Metals, Preprint* no. 15W, 1953, 20 p.

Data correlated with various substructures developed during creep testing of annealed and cold worked pure Al. Tables, graphs, micrographs. 10 ref. (Q3, Q23, Al)

978-Q. Effect of Dispersions of $CuAl_2$ on the Elevated Temperature Tensile Properties of Aluminum-Copper Alloys. C. D. Starr, R. B. Shaw, and J. E. Dorn. *American Society for Metals, Preprint* no. 16W, 1953, 13 p.

Tensile properties of 3, 4 and 5% Cu-Al alloys were investigated from 295 to 700° K. Tables, graphs, micrographs. 5 ref. (Q23, Al, Cu)

979-Q. The Fatigue Properties of Nodular Cast Iron. K. B. Palmer and G. N. J. Gilbert. *British Cast Iron Research Association. Journal of Research and Development*, v. 5, Aug. 1953, p. 2-14.

Tests on as-cast pearlitic and heat treated ferritic irons. Effect of Si addition. Tables, graphs, micrographs, diagrams, photographs.
(Q7, Si, CI)

980-Q. Some Effects of Microstructure Upon Temper Brittleness. D. C. Buffum and L. D. Jaffe. *Journal of Metals*, v. 5; *American Institute of Mining and Metallurgical Engineers, Transactions*, v. 197, 1953, p. 1373-1374.

Tempered martensite was found to be more subject to temper brittleness than pearlite or ferrite. Graphs. 11 ref. (Q23, M27, AY)

981-Q. Design Properties of Materials. I. Robert L. Stedfeld. *Machine Design*, v. 25, Oct. 1953, p. 138-148.

How properties data can be used more effectively for materials evaluation and selection. Photographs.
(Q general, P general)

982-Q. Critical Design Factors for High-Strength Steel. N. J. Wells and M. V. Ward. *Machine Design*, v. 25, Oct. 1953, p. 149-157.

How use of standard materials at increased strength levels offers practical approach to problems of weight and space conservation encountered today. Photographs, tables, graphs. (Q23, ST)

983-Q. Materials Engineering File Facts. *Materials & Methods*, v. 38, Oct. 1953, p. 153, 155, 157.

Tabulates mechanical and physical properties of carbon and low-alloy steel castings.
(Q general, P general, CI)

984-Q. Edge Dislocations in Inhomogeneous Media. A. K. Head. *Physical Society, Proceedings*, v. 66, no. 405B, Sept. 1953, p. 793-801.

Method to reduce problems of elastic plane strain in a bimetallic medium to standard problems of potential theory. Diagram. 5 ref.
(Q21, M26)

985-Q. Ultra High Strength Steel for Aircraft Structures. M. A. Melcon. *Product Engineering*, v. 24, Oct. 1953, p. 129-141.

Static, impact and fatigue properties; notch sensitivity, fabrication, and processing. Graphs, tables. 13 ref. (Q6, Q7, Q23, T24, CN)

986-Q. Yield Points in Brass Crystals. G. W. Ardley and A. H. Cottrell. *Royal Society, Proceedings*, v. 219, ser. A, Sept. 22, 1953, p. 328-341.

Study on single crystals of brass grown in A or N_2. Diagrams, graphs, micrographs. 36 ref.
(Q23, Cu)

987-Q. Charts Relating the Compressive Buckling Stress of Longitudinally Supported Plates to the Effective Deflectional and Rotational Stiffness of the Supports. Roger A. Anderson and Joseph W. Semonian. *U. S. National Advisory Committee for Aeronautics, Technical Note* 2987, Aug. 1953, 53 p.

Stability of a plate under edge compressive stress analyzed. Deflectional and rotational restraint provided by longitudinal stiffness and full-depth webs discussed. Diagrams, graphs, tables. 11 ref. (Q28)

988-Q. Column Strength of H-Sections and Square Tubes in Postbuckling Range of Component Plates. P. P. Bijlaard and G. P. Fisher. *U. S. National Advisory Committee for Aeronautics, Technical Note* 2994, Aug. 1953, 106 p.

Column buckling stress in the range where component plates have buckled was calculated by method of split rigidities. Graphs, diagrams, photographs. 19 ref. (Q28)

989-Q. Coefficient of Friction and Damage to Contact Area During the Early Stages of Fretting. I. Glass, Copper, or Steel Against Copper Douglas Godfrey and John M. Bailey. *U. S. National Advisory Committee for Aeronautics, Technical Note* 3011, Sept. 1953, 23 p.

Graphs, tables, diagrams, photograph, micrograph. 6 ref.
(Q9, Cu, ST)

990-Q. Arc Welding of Low Chromium-Molybdenum Steel Pipe. Jay Bland. *Welding Journal*, v. 32, Sept. 1953, p. 803-814.

Correlation between hardness and ductility and between hardness and tensile strength in pipe and weld deposits. Photographs, graphs, tables. 7 ref. (Q29, Q23, K1, AY)

991-Q. Load-Carrying Capacity of Fillet Weld Connections. F. Koenigsberger and H. W. Green. *Welding Journal*, v. 32, Sept. 1953, p. 859-863.

Static and fatigue loading. Diagrams, graphs, photographs, tables. (Q27, Q7, K1, ST)

992-Q. Heat-Treatment Effects on Transition Temperature of a Ship Steel. E. B. Evans and L. J. Klingler. *Welding Journal*, v. 32, Sept. 1953, p. 417s-431s.

Investigation on various subcritical heat treatments on ductility of a 1025 semikilled steel. Tables, diagrams, graphs, micrographs. 9 ref. (Q23, J general, CN)

993-Q. Fatigue Properties of Weld Metal. L. A. Harris, R. B. Matthiesen, and N. M. Newmark. *Welding Journal*, v. 32, Sept. 1953, p. 441s-453s.

Properties of specimens deposited with E7016 low-hydrogen electrodes and with E6010 high-hydrogen electrodes. Tables, macrographs, micrographs, graphs, diagrams. 11 ref. (Q7, ST)

994-Q. Scale Effect in Notch Brittleness. Yoshio Akita. *Welding Journal*, v. 32, Sept. 1953, p. 475s-480s.

Tests on mild steel specimens of geometrically similar shape. Tables, graphs. (Q23, CN)

995-Q. (Dutch.) **A Comparative Investigation on the Fatigue Strength at Fluctuating Tension of Several Types of Riveted Lap Joints, a Series of Bolted and Some Series of Glued Lap Joints of 24 ST Alclad.** A. Hartman and C. C. Duyn. *National Luchtvaartlaboratorium*, Amsterdam, Report M. 1857, 26 p.

Tables. 4 ref. (Q7, Al)

996-Q. (French.) **Precautions Taken During Fatigue Testing of Assemblies and Structures.** H. de Leiris. *Schweizer Archiv für angewandte Wissenschaft und Technik*, v. 19, no. 7, July 1953, p. 203-211.

Suggests greater care in initial stages of test. Graphs, diagrams, micrographs. 9 ref. (Q7)

997-Q. (German.) **Behavior of Steels of Varying Notch-Impact Strength During Deformation by Multiaxial Loading.** Richard Mailänder, Hubert Bennek, and Eduard Houdremont. *Archiv für das Eisenhüttenwesen*, v. 24, nos. 7-8, July-Aug. 1953, p. 315-321.

Differences of steels in tendency toward brittle fracture. Photographs, graphs, tables. 7 ref. (Q23, Q6, ST)

998-Q. (German.) **Origin of Slip Lines on Plastically Deformed Metallic Surfaces.** Wilhelm Spath. *Metalloberfläche*, Ausgabe A, v. 7, no. 8, Aug. 1953, p. 119-121.

Shows that ultrasonic waves are originated during slip of plastically deformed metals. Diagram. 9 ref. (Q24)

999-Q. (German.) **Friction and Wear Resistance Tests on Unhardened and Hardened Sheet Steel for Conveyor Chutes.** K. Wellinger and H. Uetz. *VDI Zeitschrift des Vereines deutscher Ingenieure*, v. 95, no. 26, September 11, 1953, p. 906-910.

Tests made to determine relative usefulness of soft and hard sheet steel. Diagrams, tables, graphs. (Q9, CN)

1000-Q. Some Properties of Low Alloy High Tensile Steel Containing Molybdenum. J. Pow. *Alloy Metals Review*, v. 8, Sept. 1953, p. 2-7.

Effect of a number of common alloying elements on manganese steel, stressing the advantages of molybdenum additions. Graphs, tables, photographs. (Q general, Ay)

1001-Q. Static and Fatigue Properties of Carbon, Silicon, and High-Strength Low-Alloy Steel Plates Having a Hole. Frank Baron and Edward W. Larson, Jr. *American Society for Testing Materials, Preprint* no. 73, 1953, 19 p.

Investigation to determine fatigue strengths, relationship between the fatigue strengths and the stress-strain characteristics, and relative advantages of the various steels for resisting fatigue loadings. Micrographs, graphs. 12 ref. (Q7, Q27, CN, AY)

1002-Q. Survey of Investigations of Effect of Specimen Thickness on Rockwell Tests. R. H. Heyer and V. E. Lysaght. *ASTM Bulletin*, 1953, no. 193, p. 32-39.

Important publications, and some unpublished work which merits attention of those concerned with hardness testing. Graphs, diagrams, table. 8 ref. (Q29)

1003-Q. Correlation of Published Data for Correction of Rockwell Diamond Penetrator Hardness Tests on Cylindrical Specimens. R. S. Sutton and R. H. Heyer. *ASTM Bulletin*, 1953, no. 193, p. 40-41.

Progress report. Tables. 7 ref. (Q29)

1004-Q. The Effects of Cold-Drawing, Microstructure, and Thermal Treatments on the Machinability and Mechanical Properties of Carbon and Alloy Steel. Ford E. Dreves. *ASME, Transactions*, v. 75, Oct. 1953, p. 1219-1232.

Role of cold finished steel mill in field of metal cutting. Photographs, tables, graphs, diagrams. (Q general, G17, CN, AY)

1005-Q. Some Experiments With Sleeve Bearing Metals. Borge Lunn. *Danish Academy of Technical Sciences, Transactions*, 1952, no. 2, 144 p.

Wear and mechanical properties of bearing metals and influence of lubricants. Tables, graphs, micrographs, photographs, diagram. 123 ref. (Q general, Q9, Sn, Pb, Sb, Cu, SG-c)

1006-Q. The Design of Creep-Resisting Steels. E. W. Colbeck, J. R. Rait, and J. O. Ward. *Engineering*, v. 176, Oct. 16, 1953, p. 505-506.

Work and facilities of the Hadfield laboratories. Performance of several high-alloy steels. Photographs, graphs, tables. (To be continued.) (Q3, AY)

1007-Q. Materials for High-Temperature Service. II. Howard C. Cross. *Industrial Heating*, v. 20, Oct. 1953, p. 1986, 1988, 1990, 1992, 1994-1996.

High-temperature mechanical properties of Al, Ti, Cr and Mo. Graphs, table. (To be continued.) (Q general, Al, Ti, Cr, Mo)

1008-Q. How Stable Is Titanium in Vital Operating Range? H. A. Jahnle. *Iron Age*, v. 172, Oct. 22, 1953, p. 116-119.

Stability of titanium alloys from 600 to 900° F. was improved by aging at 500 to 600° F. Graphs, photographs, tables. 3 ref. (Q general, J27, Ti)

1009-Q. The Fatigue Spin Rig, a New Apparatus for Rapidly Evaluating Materials & Lubricants for Rolling Contact. E. F. Macks. *Lubrication Engineering*, v. 9, Oct. 1953, p. 254-258.

Apparatus which permits independent evaluation of variables that affect fatigue life of bearing balls, raceways and lubricants over a wide temperature range. Photographs, diagrams. 63 ref. (Q7)

1010-Q. Neutral Holes in Plane Sheet. Reinforced Holes Which Are Elastically Equivalent to the Uncut Sheet. E. H. Mansfield. *Quarterly Journal of Mechanics and Applied Mathematics*, v. 6, Sept. 1953, p. 370-378.

Mathematical formulas to determine shape of a neutral hole and the variation along the hole boundary of the cross-sectional area of the reinforcement. Diagrams. (Q21)

1011-Q. Stress Analysis and Design of Steel Columns. Henson K. Stephenson and Kriss Cloninger. Jr. *Texas Engineering Experiment Station, Bulletin* 129, Feb. 1953, 287 p.

Practical information needed for stress analysis and design of columns and other compression members which will effectively reduce and in some cases eliminate the tedius and time-consuming labor ordinarily required for solving many of the theoretical and practical problems associated with column action. Tables, graphs. (Q25)

1012-Q. Axial-Load Fatigue Tests on Notched and Unnotched Sheet Specimens of 61S-T6 Aluminum Alloy, Annealed 347 Stainless Steel, and Heat-Treated 403 Stainless Steel. Herbert F. Hardrath, Charles B. Landers and Elmer C. Utley, Jr. *U. S. National Advisory Committee for Aeronautics, Technical Note* 3017, Oct. 1953, 28 p.

Stress-concentration factors effective in fatigue of notched specimens were found to be less than theoretical elastic values at low stresses and were approximately equal to one at the ultimate strength. Graphs, tables. 11 ref. (Q7, Al, SS)

1013-Q. (English.) **The Fatigue Testing of Structures by the Resonance Method.** R. B. Heywood. *Schweizer Archiv für angewandte Wissenschaft und Technik*, v. 19, no. 8, Aug. 1953, p. 249-260.

Machines for testing at or near resonance with special reference to testing of aircraft structures. New "slip clutch" type of exciter. Diagrams, graphs, photographs. 12 ref. (Q7)

1014-Q. (German.) **Silicon-Containing Special Brass as a Casting Material.** E. Pelzel. *Metall*, v. 7, nos. 13-14, July 1953, p. 509-513.

Influence of Si on mechanical properties and crystalline structure of brass containing 60 to 50% copper. Photographs, graphs, tables. 8 ref. (Q general, M26, Si, Cu)

1015-Q. (German.) **Evaluating the Bearing Properties of Bearing Materials. XI. A Friction-Bearing Testing Machine for Stationary Loads.** C. M. von Meysenbug. *Metall*, v. 7, nos. 19-20, Oct. 1953, p. 755-758.

MPA-Darmstadt friction-bearing testing machine which permits recording of friction, temperature, and stresses in bearings. Diagrams, photographs. 8 ref. (Q9, Q25)

1016-Q. (German.) **Evaluation of Bearing Materials by Present-Day Status of Experience.** R. Kühnel. *Metall*, v. 7, nos. 19-20, Oct. 1953, p. 759-766.

Literature on testing. Tables, graphs. 13 ref. (Q9, Cu, Pb, Al, Zn, Mg, Si)

1017-Q. (German.) **On the Concept of Strain Hardening.** W. Späth. *Metall*, v. 7, nos. 19-20, Oct. 1953, p. 772-778.

Several definitions and tests to demonstrate the principle. Diagrams, graphs. 13 ref. (Q24)

1018-Q. (German.) **Influence of Flame Cleaning on Properties of Steels.** H. Kemper and W. Pomaska. *Schweissen und Schneiden*, v. 5, no. 7, July 1953, p. 256-267.

Recommends working with highest possible gas-flow velocities and up to 50% excess oxygen. Critical temperatures must not be exceeded. Photographs, diagrams, tables, graphs. 4 ref. (Q general, L10, ST)

1019-Q. (German.) **Results of Long-Time Tests on Low-Alloy Steel at 500° C. and Up to 100,000 Hours.** A. Thum and K. Richard. *Schweizer Archiv für angewandte Wissenschaft und Technik*, v. 19, no. 8, Aug. 1953, p. 235-245.

Cause of deformationless fractures at high temperatures. Long-time creep and fatigue tests on various steels. Graphs, tables, micrographs. 10 ref. (Q3, Q7, ST)

1020-Q. (German.) **Behavior of Steel at Elevated Temperature.** Alfred Krisch. *Stahl und Eisen*, v. 73, no. 21, Oct. 1953, p. 1349-1355.

Review of literature published in 1951. Change of elastic constants, creep tests, high-temperature property investigations, stress-relief tests

and effect of chemical composition. Tables, graphs. 45 ref.
(Q21, Q3, J1, AY, SS, Al, Co, Cr, Fe-p, Mo, Ni)

1021-Q. (Russian.) **Determination of Potential Energy of Residual Deformations.** G. S. Shapiro. *Prikladnaia Matematika i Mekhanika,* v. 17, no. 1, 1953, p. 114-116.

Mathematical solution based mainly on torsional stresses in metallic rods. Graphs. 12 ref. (Q1)

1022-Q. (Russian.) **Endurance of Working Surfaces of Teeth Under Variable Load.** Z. P. Pavlov. *Vestnik Mashinostroeniia,* v. 33, no. 3, March 1953, p. 16-20.

Compares surface wear on nonhardened gears with constant and variable load. Tables, graphs. (Q9)

1023-Q. (Spanish.) **Fatigue Resistance of Structural Steel Specimens Prepared by Oxygen Cutting.** F. Koenigsberger and Z. Garcia Martin. *Ciencia y tecnica de la Soldadura,* v. 3, no. 13, July-Aug. 1953, 10 p.

Internal and external changes. Results compared with those caused by mechanical processes. Photographs, tables, graphs.
(Q7, G22, AY)

1024-Q. Carbon in Ferrous Alloys. Harry K. Ihrig and John T. Jarman. *American Foundryman,* v. 24, Nov. 1953, p. 52-57.

Series of experimental heats demonstrating how amount and form of carbon influence ferrous alloys. Effect on mechanical properties, hardenability, and microstructure. Photographs, tables, diagram, graphs. 8 ref.
(Q general, J26, M27, CI)

1025-Q. On the Complete Solution to Problems of Deformation of a Plastic-Rigid Material. J. F. W. Bishop. *Journal of the Mechanics and Physics of Solids,* v. 2, Oct. 1953, p. 43-53.

The problem of finding an equilibrium distribution of stress not exceeding the yield point in the assumed rigid regions of a deforming body. Theorems, based on the limit-load theorems of Hill, are given for determining whether such a stress distribution exists. Graphs, diagrams. 10 ref. (Q24)

1026-Q. The Compressibility of Metallic Aluminium. S. Raimes. *Physical Society, Proceedings,* v. 66, no. 406A, Oct. 1953, p. 949-951.

Method of calculating lattice parameter, compressibility and cohesive energy using method relying on assumption that valence electrons in metal are almost free. Graph.
(Q28, M26, Al)

1027-Q. Investigation of the Statistical Nature of the Fatigue of Metals. G. E. Dieter and R. F. Mehl. *U. S. National Advisory Committee for Aeronautics, Technical Note* 3019, Sept. 1953, 25 p.

Utilizes statistical methods to study the scatter found in aluminum alloys and the effect of the morphology of the carbide phase on scatter in a eutectoid steel. Graphs, tables. 11 ref. (Q7, ST, Al)

1028-Q. Impact Torsion Testing of Bolt Welds. H. E. Dixon and J. E. Roberts. *Welding Research,* v. 7, Aug. 1953, p. 96-98.

New methods of testing designed to investigate more fully possibility of differences in strength. (Q1, K9)

1029-Q. (English.) **The Effect of Temperature and Composition on the Deformation of Single Crystals of Iron.** H. W. Paxton and A. T. Churchman. *Acta Metallurgica,* v. 1, no. 5, Sept. 1953, p. 473-479.

Specimens with 0.003 and 0.005% carbon were tested from −180 to 213° C. Cleavage fracture, mechanical twinning, simple and repeated yielding and smooth stress-strain curves were observed in 0.003% carbon iron. Repeated yielding was not observed in 0.0005% carbon alloy. Graphs. 19 ref. (Q24, Fe)

1030-Q. (English.) **Le Chatelier's Principle and Stress-Induced Displacive Transformations.** E. S. Machlin and S. Weinig. *Acta Metallurgica,* v. 1, no. 5, Sept. 1953, p. 480-482.

Tests were made on a 9% molybdenum-titanium alloy. Transformation occurred along planes parallel to the planes of maximum shear stress. Graph, micrographs.
(Q24, Mo, Ti)

1031-Q. (English.) **Internal Friction of Iron and Molybdenum at Low Temperatures.** Lo-Ching Chang and M. Gensamer. *Acta Metallurgica,* v. 1, no. 5, Sept. 1953, p. 483-486.

Peaks were found at 100° K in iron and possibly at 300° K. in molybdenum, corresponding to ductile-brittle transitions in slow tension tests. Graphs, diagrams. 4 ref.
(Q22, Mo, Fe)

1032-Q. (English.) **Dimension and Orientation Effects in the Yielding of Carburized Iron Sheet Crystals.** A. N. Holden and F. W. Kunz. *Acta Metallurgica,* v. 1, no. 5, Sept. 1953, p. 495-502.

Good correlation was observed between yield behavior and crystal length in the direction of slip except when tensile axis was within 10° of a [111] direction. Micrographs, diagrams. 12 ref. (Q23, Fe)

1033-Q. (English.) **Work Hardening in Face-Centered Substitutional Alloys.** J. S. Koehler. *Acta Metallurgica,* v. 1, no. 5, Sept. 1953, p. 508-512.

Experimental data on mechanical properties of single crystals. Source and impurity hardening are shown to be more important than interference hardening. Experiments suggested. Graphs, micrographs. 17 ref. (Q general)

1034-Q. (English.) **Energy Absorption and X-Ray Studies of Kink Formation in Zinc Single Crystals.** E. I. Salkovitz and J. S. Koehler. *Acta Metallurgica,* v. 1, no. 5, Sept. 1953, p. 552-567.

Experiments revealed two consecutive stages are involved. A qualitative dislocation model is presented. Tables, graphs, photographs. 7 ref. (Q24, Zn)

1035-Q. (English.) **Study of the Origin of the Cube Texture.** A. Merlini and P. A. Beck. *Acta Metallurgica,* v. 1, no. 5, Sept. 1953, p. 598-606.

Cross-rolled copper did not develop cube texture on annealing. Results are in accordance with the oriented growth theory. Graphs, diagrams. 24 ref. (Q24, Cu)

1036-Q. (English.) **Additional Notes on Textures in Extruded Aluminum.** K. V. Gow. *Acta Metallurgica,* v. 1, no. 5, Sept. 1953, p. 610.

Coincidence lattice sites are important in determining orientation dependence of grain boundary migration rates. 3 ref. (Q24, Al)

1037-Q. (English.) **Vibration of Plates Covered With a Damping Layer.** A. Van Itterbeek and H. Myncke. *Acustica,* v. 3, no. 4, 1953, p. 207-212.

Damping effects of a thin layer of bitumin emulsion containing schist powder or similar products on steel plates. Graphs, photographs, diagrams. (Q8, ST)

1038-Q. (German.) **Physics of Permanent Deformations.** W. Späth. *Metall,* v. 7, nos. 17-18, Sept. 1953, p. 679-683.

Certain fundamental phenomena of flow, thermo-electric effect at displacements, internal damping, equilibrium processes, metallurgical microprocesses and tendency toward brittle fracture by metals. Diagrams. 28 ref. (Q24, Q26)

1039-Q. (German.) **X-Ray Lattice-Constant Measurements on Plastically Deformed Steel Specimens.** *Naturwissenschaften,* v. 40, no. 19, Oct. 1953, p. 507-508.

Reviews literature comparing X-ray with mechanical measurements. Graphs. 12 ref. (Q24, M22, ST)

1040-Q. (German.) **Design Strength and Wearing Quality of High-Strength Gear Wheels.** A. Thum and K. Richard. *Schweizer Archiv für angewandte Wissenschaft und Technik,* v. 19, no. 9, Sept. 1953, p. 267-278.

Critical discussion on the basis of experiments and review of the literature. Effect of the material, direction of the grain, heat treatment and tooth size and shape. Diagrams. 45 ref.
(Q9, M27, J general, AY)

1041-Q. (German.) **Notched-Bar Impact Testing According to H. H. Schnadt.** Alfred Krisch. *Stahl und Eisen,* v. 73, no. 19, Sept. 10, 1953, p. 1215-1225.

Schnadt's theory is correlated with Huber-von Mises-Hencky hypothesis. Stress ratios for ductile and brittle fracture. Variations of impact testing. Graphs, tables, diagrams, photographs. 36 ref. (Q6, ST)

1042-Q. (German.) **Speeding the Flow of Metals in Paraffin Oil by Addition of Polar Compounds.** Werner Klinkenberg, Kurt Lücke, and Georg Masing. *Zeitschrift für Metallkunde,* v. 44, no. 8, Aug. 1953, p. 362-369.

Experiments made on the effect of surface active substances dissolved in polar compounds on plastic flow of very thin specimens. Attention was paid to Rehbinder effect which was observed on gold. Diagrams, graphs. 36 ref.
(Q24, Au, Zn)

1043-Q. (German.) **Properties of Metallic Melts. VI. Internal Friction of Liquid Silver-Tin Alloys.** Erich Gebhardt, Manfred Becker, and Erich Trägner. *Zeitschrift für Metallkunde,* v. 44, no. 8, Aug. 1953, p. 379-382.

Dependence on temperature and concentration. Graph, table. 14 ref.
(Q22, Ag, Sn)

1044-Q. Nomograph for Determining Course of Tension During Pure Bending for Materials With Linear Solidification. Rudolf Böklen. *Zeitschrift für Metallkunde,* v. 44, no. 8, Aug. 1953, p. 382-386.

Plots flow curve from equilibrium moments during loading and unloading to represent distribution of stresses in rectangular and circular bars. Graphs, diagrams, tables, photograph. 6 ref. (Q27, Q5)

1045-Q. (Polish.) **Low Tin and Tellurium Bearing Alloy.** S. Balicki and W. Babinski. *Prace Instytutow Hutnictwa,* v. 5, no. 2, 1953, p. 82-88.

Investigations on mechanical properties have shown no great changes when treated at temperatures up to 100° C. Tables, graphs, micrographs. 7 ref.
(Q general, Sn, Te, SG-c)

1046-Q. (Portuguese.) **Relationship Between the Brinell Hardness and the Microstructure of Ordinary Lamellar-Graphite Cast Iron.** Werner Grundig. *ABM (Boletim da associacao brasileira de metais),* v. 9, no. 31, Apr. 1953, p. 169-188.

Experimental investigation on 80 specimens. 23 ref. (Q29, M27, CI)

1047-Q. (Russian.) **Impact Strength of Welded Joints of Railroad Cars of Openhearth and Bessemer Steel.** S. V. Vershinski. *Avtogennoe Delo,* v. 24, no. 6, June 1953, p. 5-10.

Brittle fracture of bessemer steel and plastic deformation of openhearth steel. Diagrams, tables, photographs. (Q6, K general, ST)

1048-Q. (Russian.) **Investigation of Antifriction Properties of Chromium With Mechanical Porosity.** D. N. Garkunov and A. A. Poliakov. *Vestnik Mashinostroeniia,* v. 33, no. 6, June 1953, p. 65-67.

Compares mechanical and electrolytic porous chromium for wear and friction coefficients. Photographs. (Q9, Cr, CI)

1049-Q. (Swedish.) **Correlation Between Tensile Strength and Casting Dimension for Gray Cast Iron.** M. Itzel and E. O. Lissell. *Gjuteriet,* v. 43, no. 8, Aug. 1953, p. 143-147.

Numerous tests. Probable minimum tensile strengths calculated for round and rectangular cross sections of various sizes. Diagrams, graphs. 9 ref. (Q27, CI)

1050-Q. (Pamphlet.) **The Nimonic Alloys.** Ed. 2. 41 p. 1952. Henry Wiggin & Co., Ltd., Birmingham, England.

Data on mechanical properties of Nimonic alloys are presented in tabular form. (Q general, Ni)

1051-Q. (Book.) **Properties of Metallic Surfaces.** 368 p. Institute of Metals, 4 Grosvenor Garden, London, S.W. 1, England. 35s. ($5.50)

Symposium held by the Metal Physics Committee of Institute of Metals. Discusses 13 papers showing importance of surface finish as contributing to strength, service performance and life of a metal component. Includes: "Specialized Microscopical Techniques in Metallurgy", S. Tolansky; "Radioisotopes in the Study of Metal Surface Reactions in Solutions", M. T. Simnad; "Influence of Machining and Grinding Methods on the Mechanical and Physical Condition of Metal Surfaces", Peter Spear, Ian R. Robinson and K. J. B. Wolfe; "Effect of Lubrication and Nature of Superficial Layer After Prolonged Periods of Running", F. T. Barwell; "Crystalline Character of Abraded Surfaces", P. Gay and P. B. Hirsch; "Effect of Surface Conditions on the Mechanical Properties of Metals, Mainly Single Crystals", E. N. da C. Andrade; "Effect of Surface Condition on the Strength of Brittle Materials", G. C. Gurney; "Influence of Surface Condition on the Strength of Steel", R. J. Love; "Influence of Surface Films on the Friction and Deformation of Surfaces", F. P. Bowden and D. Tabor; "Diffusion Coatings", D. M. Dovey, I. Jenkins and K. C. Randall; "Nature and Properties of the Anonic Film on Aluminum and Its Alloys", H. W. L. Phillips; "Chemical Behavior as Influenced by Surface Conditions", U. R. Evans; "Effect of Method of Preparation on the High-Frequency Surface Resistance of Metals", R. G. Chambers and A. B. Pippard.
(Q general, M general, G17, G18, L general)

R

Corrosion

452-R. Intergranular Corrosion of Ferritic Stainless Steels. R. A. Lula, A. J. Lena, and G. C. Kiefer. *American Society for Metals, Preprint* no. 32, 1953, 27 p.

Susceptibility to intergranular attack in various acid mixtures when rapidly cooled from temperatures above 1700° F. Tables, graphs, micrographs, photographs. 12 ref. (R2, SS)

453-R. Tests on the Corrosion of Buried Iron and Steel Pipes. J. C. Hudson and G. P. Acock. *British Iron and Steel Research Association, Special Report* no. 45, 1952. p. 1-28; disc., p. 111-153.

Corrosion of cast iron pipes and tubes, buried in five representative soils for five years. Bare and coated specimens were tested. Tables. (R8, CI, ST, Zn)

454-R. Investigations on Underground Corrosion. K. R. Butlin, W. H. J. Vernon, and L. C. Whiskin. *British Iron and Steel Research Association, Special Report* no. 45. 1952. p. 29-38; disc., p. 111-153.

Part I: Fundamental studies on sulphate-reducing bacteria and their effect on iron. Part II: Experiments on protection of ferrous pipes. Photograph, table. 8 ref. (R8)

455-R. Corrosion of Buried Copper and Ferrous Strip in Natural and Salted Soils. *British Iron and Steel Research Association, Special Report* no. 45. 1952. p. 39-54; disc., p. 111-153.

Investigation to determine relative corrodibility in different soils. Effect of salt treatment. Tables, graphs. 2 ref. (R8, CI, CN, Cu, Fe)

456-R. Tests on the Corrosion of Buried Aluminium, Copper, and Lead. P. T. Gilbert and F. C. Porter. *British Iron and Steel Association, Special Report* no. 45. 1952. p. 55-74; disc., p. 111-153.

Tubes of commercial-purity Al, phosphorus-deoxidized arsenical Cu, and Pb were buried. Soils used were salt marsh, London clay, moist neutral clay, Keuper Marl, and cinders. Results of examination after burial for five years are given. Tables. 5 ref. (R8, Al, Cu, Pb)

457-R. Cathode Protection of Buried Metal Structures. R. de Brouwer. *British Iron and Steel Research Association, Special Report* no. 45. 1952. p. 95-110; disc., p. 111-153.

Cathodic protection by polarized and forced drainage processes. Diagrams, graphs. (R10)

458-R. Cathodic Protection. K. A. Spencer. *British Iron and Steel Research Association, Special Report* no. 45. 1952. p. 75-94; disc., p. 111-153.

Principal causes of corrosion of buried steel structures and theory of protection by cathodic methods. Graphs, diagrams, table. 9 ref. (R10)

459-R. Corrosion Control of Steel Equipment. T. R. B. Watson. *Canadian Chemical Processing,* v. 37, Sept. 1953, p. 46, 48, 50, 52, 54.

Causes of corrosion and control by means of cathodic protection. (R10, ST)

460-R. Corrosion. A Field for Action. W. H. J. Vernon. *Chemistry & Industry,* 1953, no. 38, Sept. 19, p. 982-987.

Historical review. Diagram, graph. 6 ref. (R general)

461-R. Note on the Anomalous Behaviour of Ammonium Chloride Particles on the Corrosion of Steel in Humid Atmospheres. B. Sanyal and R. St. J. Preston. *Chemistry & Industry,* 1953, no. 38, Sept. 19, p. 995-997.

Corrosion rate was found to decrease with increased humidity. Photographs, tables. 6 ref. (R3, ST)

462-R. Corrosive Attack by Acidic Decomposition Products Evolved by Paints While Drying. *Corrosion,* v. 9, Oct. 1953, p. 344.

Helicopter blades, stored in painted boxes, were corroded by volatile acids from the drying paint. (R5, ST, Al, Mg)

463-R. Resistance of Aluminum Alloys to Weathering. C. J. Walton, D. O. Sprowls, and J. A. Nock, Jr. *Corrosion,* v. 9, Oct. 1953, p. 345-358.

Results of extensive testing over a period of 20 years and actual use over 52 years. Photographs, tables, graphs. 11 ref. (R3, Al)

464-R. Some Marine Aspects of Cathodic Protection. K. N. Barnard. *Engineering Journal,* v. 36, Sept. 1953, p. 1131-1132, 1138.

Applications on ships' hulls. (R10)

465-R. How Cathodic Protection Can Slow Down Corrosion. A. W. Peabody. *Factory Management and Maintenance,* v. 111, Oct. 1953, p. 140-144.

Galvanic corrosion and uses and limitations of cathodic protection. Diagrams. (R10)

466-R. Corrosion in Closed Circulating Water Systems. Sidney Sussman and James B. Fullman. *Heating and Ventilating,* v. 50, Oct. 1953, p. 77-82.

Effect of temperature, O_2, chemicals, leakage and design on corrosion. Graphs, diagrams, photograph. (R4)

467-R. Corrosion. Mars G. Fontana. *Industrial and Engineering Chemistry,* v. 45, Oct. 1953, p. 95A-97A.

Electrolytic etching of cast and wrought stainless steels in oxalic acid (15 min.) as a screening procedure for the 240-hr. nitric acid test. Photographs, micrographs. (R6, SS)

468-R. 430 Stainless Is Hardy Civilian. A. H. Thomas. *Steel,* v. 133, Sept. 28, 1953, p. 88-89.

Outdoor corrosion research. Photographs. (R3, SS)

469-R. Vulnerability of Drill Pipe to Corrosion Fatigue. Stanley C. Moore and A. P. Farr. *World Oil,* v. 137, Oct. 1953, p. 200, 202, 204, 206, 208.

Corrosion problems in drilling oil wells in the Permian Basin. Graph, photograph. 8 ref. (R2, CN)

470-R. (French.) **Practical Considerations of Titanium.** *Metallurgie et la construction méchanique,* v. 85, no. 8, Aug. 1953, p. 615-617.

Corrosive action of salt water. Difficulties of obtaining pure Ti. Mechanical properties of sheet and bar Ti and Ti alloys. Table, graph. (R5, Q general, C general, Ti)

471-R. (French.) **Gaps in Aluminum Layer on Clad Au-G Alloy (Duralumin) in Relation to Protection Afforded Against Corrosion.** G. Gauthier. *Revue de metallurgie,* v. 50, no. 8, Aug. 1953, p. 551-557.

Tests to determine the effect of scratches accidentally made during fabrication or service. Graphs, micrographs. (R2, Al)

472-R. (German.) **Corrosive Effects of Varying Concentrations of Nitric and Sulfuric Acids on Welds of Aluminum and Aluminum Alloys.** Waldemar Bleicher and Albrecht Müller-Busse. *Werkstoffe und Korrosion,* v. 4, nos. 8/9, Aug./Sept. 1953, p. 273-280.

Concentrations of either acid acted rapidly on the welds. Graphs, micrographs, photographs. 5 ref. (R5, K general, Al)

473-R. (German.) **Corrosive Action of Highly Concentrated Nitric Acid on Iron.** Erich Fitzer, Hans Hohn, and Johann Sekal. *Werkstoffe und Korrosion,* v. 4, nos. 8/9, Aug./Sept. 1953, p. 290-298.

Influence of test conditions, pretest treatment and composition on intergranular attack is described. Photographs, graphs, tables. 10 ref. (R6, Fe)

474-R. (German.) **Corrosive Behavior of Iron-Containing 90/10 Copper-Nickel Alloys.** Karla Krafack and Erich Franke. *Werkstoffe und Korrosion,* v. 4, nos. 8/9, Aug./Sept. 1953, p. 310-315.

Behavior in sea water under various test conditions. Graphs, tables. (R4, Cu, Ni)

475-R. Methods of Controlling Corrosion. *American Gas Journal,* v. 179, Oct. 1, 1953, p. 137-138.

Avoiding corrosive areas of soil and coating surface of buried pipe. (R8)

476-R. Cathodic Protection. *American Gas Journal,* v. 179, Oct. 1, 1953, p. 138-140.

Techniques and applications of principle. Diagrams. (R10)

477-R. Atmospheric Exposure of Light Metals. L. H. Adam. *American Society for Testing Materials, Preprint* no. 13s, 1953, 24 p.

Tests using 27 aluminum and 8 magnesium alloys. Extensive photographs. (R3, Al, Mg)

478-R. Worthite. W. E. Pratt. *Chemical Engineering,* v. 60, Nov. 1953, p. 264, 266, 268, 270, 272, 274, 276, 278.

Resistance of high-chromium alloy to a number of corrosives, mechanical properties, and applications in chemical industry. (R general, Q general, T29, Cr)

479-R. Corrosion and Silting in Water Meters. P. Scanes. *Instrument Engineer,* v. 1, Oct. 1953, p. 69-71.

Meter design, effects of different waters, materials of manufacture and interference from foreign matter. Photographs, diagrams. (R4, S21)

480-R. Corrosion of Aluminium Alloys in Supply Waters. F. C. Porter and S. E. Hadden. *Journal of Applied Chemistry,* v. 3, Sept. 1953, p. 385-409.

Severe pitting of aluminum and its alloys caused by action of stagnant or slow-moving water. Tables, photographs, graphs. 8 ref. (R4, Al)

481-R. Resistance of Aluminum Alloys to Chemically Contaminated Atmospheres. W. W. Binger, R. H. Wagner and R. H. Brown. *Light Metal Age,* v. 11, Oct. 1953, p. 18-22, 28.

Use of aluminum-base alloys in coke, soda ash, sulfur, power, paper, salt, petroleum and petrochemical industries has reduced corrosion losses with resultant savings in maintenance costs. Table, diagrams. (R3, T29, Al)

482-R. Cathodic Protection of Under River Pipe Lines. C. C. Lloyd and John R. Whiteney. *Pipe Line News,* v. 25, Oct. 1953, p. 46-51. Reprinted from *Corrosion,* v. 9, no. 9, p. 303-306.

Details of design including discussion of anodes and wiring. Table, diagrams, graphs. (R10, CN)

483-R. Packaged Corrosion Losing to VPI. William R. Wolfe. *Steel,* v. 133, Oct. 26, 1953, p. 132, 134-135.

Vapor phase inhibitor is efficient in preserving ferrous parts and is making many messy, expensive and inconsistent methods obsolete. Photographs, tables. (R10)

484-R. Uneven Corrosion in Alkaline Pulping Digesters. Francis W. Flynn, Frederick H. Richter, and Frederick B. Snyder. *Tappi,* v. 36, Oct. 1953, p. 433-444.

Major cause and possible cures. Diagrams, graphs, photographs. (R7, SS)

485-R. Corrosion and Deposits in Regenerative Air Preheaters. J. F. Barkley, Hilmer Karlsson, A. A. Berk, C. F. Stark and L. R. Burdick. *U. S. Bureau of Mines, Report of Investigations* 4996, 1953, 23 p.

Field tests made under regular operating conditions of an air preheater serving an underfeed, stoker-fired, water-tube boiler. Plant equipment. Pertinent plant operating data over testing period tabulated. (R11, Cu, SS, AY, CI)

486-R. Types of Corrosion. *Western Machinery and Steel World,* v. 44, Oct. 1953, p. 108-109.

Basic causes and various types. Photographs. (R general)

487-R. (German.) **Behavior of Aluminum Towards Food.** Franz Ritter. *Aluminium Ranshofen Mitteilungen,* 1953, no. 2, July, p. 35-37.

Corrosive effects. (R7, Al)

488-R. (German.) **Container Materials for Liquid Explosives Produced From Concentrated Nitric Acid.** Hans Hohn and Erich Fitzer. *Berg- und hüttenmännische Monatshefte der montanistischen Hochschule in Leoben,* v. 98, no. 9, Sept. 1953, p. 187-193.

Test data which indicate aluminum is superior to iron. (R6, T29, Fe, Al)

489-R. (German.) **The Corrosive Behavior of Special Cast-Brass Alloys.** E. Pelzel. *Metall,* v. 7, nos. 19-20, Oct. 1953, p. 767-771.

Tests on aluminum-containing brasses with additions of iron, manganese and nickel; silicon-containing brasses with additions of arsenic, lead, manganese and nickel; and copper-zinc alloys with nickel and tin. Tests were made in 10% hydrochloric acid solutions, synthetic seawater and 3% sodium chloride solution with 0.1% hydrogen peroxide. Graphs, tables. 8 ref. (R11, Cu, Al, Si, Zn, Ni, Sn, Fe, Mn, As, Pb)

490-R. (German.) **Extent of Flade Potential of Activation and Passivation of Iron, and Other Properties of the Passive Layer.** Klaus J. Vetter. *Zeitschrift für physikalische Chemie,* v. 202, nos. 1-2, July 1953, p. 1-13.

Explains positive potential value by fact that oxide at oxide-electrolyte surface is not saturated by dissolved Fe but becomes an unsaturated oxide through corrosion and has a much higher O_2 partial pressure. Diagrams, graph. 33 ref. (R10, Fe)

491-R. Aluminum Bronze Alloy Used in Large Cast Water Wheels to Resist Pitting by Cavitation. *Western Metals,* v. 11, Oct. 1953, p. 76-77.

Tensile strength; corrosion fatigue strength; hardness; yield point; cold working qualities; and how grain size, shape and structure affect ability of a metal to withstand pitting. Field tests with aluminum bronze alloy. Photographs. (R2, T25, Al)

492-R. (German.) **Behavior of Pure Aluminum and Superpure Aluminum in Boiling Water.** D. Altenpohl. *Aluminium,* v. 29, no. 9, Sept. 1953, p. 361-370.

Methods for applying colorless "Bohmit" films which offer corrosion protection against acids. Photographs, graphs, tables. 17 ref. (R4, Al)

493-R. (German.) **Experiences on Corrosion and Corrosion Protection on Iron and Steel.** (Review of Literature of 1950 and 1951). Heinrich Klas and Walter Hogartz. *Stahl und Eisen,* v. 73, no. 20, Sept. 24, 1953, p. 1302-1308.

Metallic and nonmetallic protective coatings. 134 ref. (R10, L general, Fe, ST)

494-R. (German.) **Increasing Corrosion-Fatigue Strength of Steel by Internal Stress.** Hans Bühler. *VDI Zeitschrift des Vereines deutscher Ingenieure,* v. 95, no. 27, Sept. 21, 1953, p. 945.

5 references. (R1, ST)

495-R. (Book.) **Corrosion of Buried Metals.** L. C. Whiskin, chairman. 1952. 153 p. British Iron and Steel Research Association, 11 Park Lane, London W. 1, England. (Special Report no. 45.)

Results of recent research and current information on the corrosion of buried metals. (R8)

S

Inspection and Control

384-S. Some Tools for Quality Control. Thomas W. Curry. *Foundry,* v. 81, Oct. 1953, p. 110-113, 214, 216-217, 220, 222.

How a leading gray iron foundry goes about controlling variables involved in foundry practice. Photographs. (S12, E general, CI)

385-S. Non-Destructive Gamma Radiography for Diamond Tools. *Industrial Diamond Review,* v. 13, Sept. 1953, p. 210-212.

Technique for testing the setting of diamond tools. Photographs, table. 10 ref. (S14)

386-S. "Immersion" Increases Efficiency of Ultrasonic Weld Inspection. John Starr. *Industry & Welding,* v. 26, Oct. 1953, p. 64-66, 68, 71.

How most objectionable features are eliminated from older units. Photographs, diagrams. (S13)

387-S. Automatic Process Control. *Iron Age,* v. 172, Oct. 8, 1953, p. 273-320.

Latest developments in the field, including gaging, sorting, heat treating, plating solution control, melting, rolling, welding, counting, weighing and foundry practice. (S18)

388-S. Conductivity. Now a Useful Nondestructive Testing Tool. Henry N. Staats. *Materials & Methods,* v. 38, Oct. 1953, p. 124-126.

Instrument, developed in Germany, which directly measures electrical conductivity of materials. It can be used for sorting nonferrous metals and alloys, identifying unknown metals, evaluating hardness and checking heat treating results. Photographs, charts. (S10, P15, Al, Mg)

389-S. Measurement and Control of the Thickness of Thin Films. K. M. Greenland. *Vacuum,* v. 2, July 1952, p. 216-230.

Gravimetric, photometric, polarimetric, interferometric, X-ray and electrical methods. Diagrams. 56 ref. (S14)

390-S. (German.) **Principles and Methods of Nondestructive Testing With Ultrasound Waves.** A. Lutsch. *Archiv für technisches Messen,* 1953, no. 212, Sept. p. 209-210.

16 references. (S13, S14, S15)

391-S. (German.) **Ultrasonic Testing of Weld Seams.** Hans Krächter, J. Krautkrämer, and H. Krautkrämer. *Schweissen und Schneiden,* v. 5, no. 8, Aug. 1953, p. 305-314.

Ultrasonic and X-ray techniques. Photographs, diagrams, tables, graph. (S13)

392-S. (Italian.) **Radiographic Examination of Welds. A Complete Assessment of Defects in Terms of Tensile and Fatigue Strength.** Oscar Masi and Antonio Erra. *Metallurgia italiana,* v. 45, no. 8, Aug. 1953, p. 273-283.

Tables, diagrams, graphs, photographs. 7 ref. (S13, Q27, Q7)

393-S. The Industrial Applications of Radioactive Materials. John Cockcroft. *Atomics (British),* v. 4, Oct. 1953, p. 245-252.

General field of uses. Photographs, diagrams, tables. (S19)

394-S. Radiation Pyrometry. T. J. Schlottenmier. *Instrument Society of America, Proceedings,* v. 7, 1952, p. 102-111.

Principles of radiation pyrometry, with emphasis of energy transfer

considerations and factors affecting target size and definition. Diagrams, photographs. 3 ref. (S16)

395-S. How Form Tolerances Affect Gaging Requirements. Earle Buckingham. *Machinery,* v. 60, Oct. 1953, p. 197-203.

How profile tolerances are selected and how they determine gaging requirements. Diagrams. (S14)

396-S. Optical Gaging of Cams Saves Time. *Western Machinery and Steel World,* v. 44, Oct. 1953, p. 94-95.

How principles can be applied to similar problems arising on production lines and in machine shops. Diagram, photographs. (S14)

397-S. (French.) **Use of Radio-Elements in Metallurgy.** A. Kohn. *Institut de Recherches de la Sidérurgie, Publication,* ser. B, no. 20, June 1953, 22 p. Reprinted from *Documentation Métallurgique,* Jan., Feb., Mar., 1953, no. 13, p. 9-30.

Methods. Tables, micrographs. 79 ref. (S19, Cr, Sb, Fe, Co, K)

398-S. (German.) **A. Testing With Energy Radiation. Testing with X-Rays, Gamma-Rays, and Beta-Rays.** R. Berthold. *Berg- und hüttenmännische Monatshefte der montanistischen Hochschule in Leoben,* v. 98, nos. 7-8, July-Aug. 1953, p. 123-126.

Methods of testing for casting defects, corrosion, bearing wear, volume of sealed containers, furnace linings, wall thickness and densities. Graphs. (S13, S14, R11, Q9, P10)

399-S. (German.) **Synthetic Radioactive Isotopes in Nondestructive Materials Testing.** E. A. W. Müller. *Berg- und hüttenmännische Monatshefte der montanistischen Hochschule in Leoben,* v. 98, nos. 7-8, July-Aug. 1953, p. 126-130.

Preparation, economy and effect of intensity and conditions on test results. Diagrams, photographs. (S19)

400-S. (German.) **Measurement of Surface Temperature With Rolled-Out Thermocouple Elements.** W. Nunner. *Chemie-Ingenieur-Technik,* v. 25, no. 7, July 1953, p. 386-390.

Simple arrangement. Annealing of wires after rolling permits continued use of original calibration curve without error. Graphs, photograph. 7 ref.
(S16, Ni, Pd, Ag, Cu, Pt, Au, Fe)

401-S. Measuring Surface Roughness. *Canadian Metals,* v. 16, Oct. 1953, p. 66-67.

Electronic roughness tester, particularly suitable for workshop, which can be used for the above against chosen standards. Table, diagram. (S15)

402-S. Movable-Anode Tube Gages Surface Roughness. Joseph B. Bidwell. *Electronics,* v. 26, Nov. 1953, p. 181-183.

Unit adaptable to wide range of surfaces. High electrical output of tube reduces complexity of amplifying and indicating circuits. Diagrams, graphs, photographs. (S15)

403-S. Wire Testing by Ultrasonic Methods. R. Pohlman. *Engineers' Digest,* v. 14, Oct. 1953, p. 393-394.

Translated from *Draht,* v. 4, no. 6, June 1953, p. 211-214. Testing of small or thin sections by the "transmitted pulse" method. Diagrams. (S13)

404-S. Metal-Ceramic Wall. Lengthens Thermocouple Life. P. B. McSherry. *Iron Age,* v. 172, Oct. 29, 1953, p. 100-101.

Composition of new protective tubes and characteristics imparted by each ingredient. Photographs, diagrams. (S16, T5)

405-S. Analysis and Correlation of Test Data. Irving W. Burr. *Metal Progress,* v. 64, Oct. 1953, p. 112-118, 282-284.

Technique and advantages of applying statistical methods to the analysis of test data. Graph, table, photographs. (S12)

406-S. (German.) **Magnetic and Electrical Methods of Nondestructive Testing.** Werner Jellinghaus. *Berg- und Hüttenmännische Monatshefte der montanistischen Hochschule in Leoben,* v. 98, nos. 7-8, July-Aug. 1953, p. 168-174.

Methods of investigating properties, locating defects and making thickness measurements. Diagrams, graphs. 29 ref. (S13, S14)

407-S. (German.) **Electronic Instruments for Nondestructive Materials Testing.** H. Breitfeld. *Berg- und Hüttenmännische Monatshefte der montanistischen Hochschule in Leoben,* v. 98, nos. 7-8, July-Aug. 1953, p. 175-178.

The "Forster", "Magnatest Q", "Multitest" and "Sigmatest" instruments. (S13, Al, Cu)

408-S. (German.) **Magnetic Powder Testing.** E. A. W. Müller. *Berg- und Hüttenmännische Monatshefte der montanistischen Hochschule in Leoben,* v. 98, nos. 7-8, July-Aug. 1953, p. 178-180.

Different procedures for detecting defects. Photographs, diagrams. (S13)

409-S. (German.) **Nondestructive Testing of Large Castings.** *Giesserei,* v. 40, no. 20, Oct. 1953, p. 543-547.

Oil-line, magnetic-powder, and stress-gage processes, and water-pressure, X-ray, and ultrasound test methods. Photographs, graphs. (S13, CI, Ni, Cr)

410-S. (Book.) **Statistical Quality Control and Acceptance Sampling. (Ordnance Inspection Handbook ORD-M 608-9).** U. S. Army Ordnance Corps. 1952. 103 p. Office of Technical Services, U. S. Department of Commerce, Washington 25, D. C. $2.00.

Reviews fundamentals governing sampling procedures and quality control. Tables, charts. (S12)

T
Applications of Metals in Equipment

329-T. Some Properties of Copper and Its Alloys Used in the Chemical Industries. David D. Stead. *Australasian Engineer,* 1953, Feb. p. 50-56.

Graphs, tables. 12 ref.
(T29, P general, Q general, Cu)

330-T. Aluminum Progress That Brings New Products. *Dun's Review and Modern Industry,* v. 62, Aug. 1953, p. 51-57.

Photographic review of this industry that now produces over 100,000 tons per month. (T general Al)

331-T. An Aluminium Alloy Bascule Bridge. *Engineer,* v. 196, Oct. 2, 1953, p. 429-431.

Movable spans of Al alloy. Novel methods of fabrication, operation and counterbalancing. Photograph, diagrams, tables. (T26, Al)

332-T. Choosing the Right Copper-Base Alloy. Harold J. Roast. *Foundry,* v. 81, Oct. 1953, p. 114-115.

Recommendations on different types of alloys for various applications depending on qualities desired in castings. Photograph.
(T general, E general, Cu)

333-T. Which New Material Shall I Use? A Summary of Recent Developments. I. Julius J. Harwood. *Machine and Tool Blue Book,* v. 49, Oct. 1953, p. 208-210, 212, 214-216, 218-220, 222, 224-232.

Properties and possible uses of Ti, Al steels and reinforced plastics for rockets, missiles and atomic reactors. (To be continued.)
(T2, T25, Ti, Al, ST)

334-T. Designing Springs. II. Stanley L. Albright. *Machine Design,* v. 25, Oct. 1953, p. 222-226.

How to achieve simplification and reduce costs. Diagrams. (T7)

335-T. Stainless Tubing in Radar Screens. *Materials & Methods,* v. 38, Oct. 1953, p. 116-118.

New fabricating procedure in step-by-step illustrations. Photographs. (T1, SS)

336-T. Wear Resistant Metal. E. L. Schaper. *Materials & Methods,* v. 38, Oct. 1953, p. 120-123.

Successful use of Mg alloys in bearings, shafts and gears. Photographs, tables. (T7, Mg)

337-T. Where Aluminum Die Castings Are Used to Withstand High Stress. George W. Coleman. *Precision Metal Molding,* v. 11, Oct. 1953, p. 61, 123-124.

Applications and advantages. Photographs. (T general, Q general, Al)

338-T. Ductile Iron Makes Good. *SAE Journal,* v. 61, Oct. 1953, p. 45-48.

Based on "Nodular Iron in Tractor Motors", H. L. Day; "Irons With Spheroidal Graphite", R. W. Mason, Jr.; and "Ductile Iron as an Engineering Material", B. L. Stott; presented at SAE Annual Meeting, Detroit, Jan. 13, 1953. Applications of spheroidal-graphite cast iron. Photographs. (T general, CI)

339-T. The Use of Multilayer High Reflecting Films for Reflection Multiple-Beam Interferometry. S. Tolansky. *Vacuum,* v. 2, July 1952, p. 231-244.

Photographs. 9 ref. (S11)

340-T. The Sheathing of Cables With Aluminum. Kenneth S. Wyatt. *Wire and Wire Products,* v. 28, Oct. 1953, p. 1062-1068.

New process and applications.
(T7, Al)

341-T. Farm Equipment Steels. *Agricultural Engineering,* v. 34, Oct. 1953, p. 695-701.

Consists of "A Harvesting Machinery Engineer's Viewpoint", C. J. Scranton; "A Tillage Implement Metallurgist's Viewpoint", W. C. Bliesener; "A Tractor Engineer's Viewpoint", W. H. Nordenson; "A Steel Producer's Viewpoint", H. W. Browall. (T3, ST)

342-T. Aluminum Ceiling Panels for Heating and Cooling. E. S. Howarth, S. C. Huddleston, and R. M. Kock. *American Society of Heating and Ventilating Engineers, Transactions,* v. 57, 1951, p. 343-360; disc., p. 360-362.

Tests. Photographs, tables, graphs. (T27, Al)

343-T. An Investigation of Cemented Tungsten Carbide as Bearing Material. J. S. Kozacks, H. A. Erickson, H. W. Highriter, and A. R. Gabriel. *ASME, Transactions,* v. 75, Oct. 1953, p. 1203-1209.

Performance of bearings with different lubricating oils under varying load conditions.
(T7, H general, C-n)

344-T. Increasing Use of Die Casting for Automotive Components. Thomas MacNew. *Automotive Industries,* v. 109, Oct. 15, 1953, p. 38-41, 98, 101.

New applications and their advantages. Photographs.
(T21, E13, Al, Mg)

345-T. Aluminum - Alloy Bascule Bridge at Aberdeen. *Engineering,* v. 176, Oct. 16, 1953, p. 481-483.

"Double-leaf trunnion-mounted type". Photographs, plans. (T26, Al)

346-T. Design for a Modern Instrument Shop. G. L. Slocum. *Instrument Society of America, Proceedings,* v. 7, 1952, p. 28-29.

Importance of instruments in modern refineries. Progress, modern designs, practices and operating methods are discussed. Photograph. (T8)

347-T. Experience With Aluminum Tubing for Instrument Air Connections. D. W. Humphrey. *Instrument Society of America, Proceedings,* v. 7, 1952, p. 73-75.

Availability, installation practices, users, and cost of Al tubing for instrument air connections. Photographs. (T8, Al)

348-T. Unique Steel Selection Method Reduces Die Costs. *Machinery,* v. 60, Oct. 1953, p. 188-191.

Use of matched toolsteels for better production. Photographs. (T5, T6, TS)

349-T. Making Hollow Steel Propeller Blades. *Machinery (London),* v. 83, Oct. 16, 1953, p. 757-766.

Step-by-step manufacture by de Havilland Propellers, Ltd. Photographs, diagrams. (T24, ST)

350-T. Aluminum Sheet Metal Practice in the Building Industry. *Modern Metals,* v. 9, Oct. 1953, p. 62, 64, 66, 68.

Cornices, gutters, downspouts, ductwork, flues and chimneys. Photographs, tables, diagrams. (T26, Al)

351-T. When Can You Use Cast Iron in the Refinery? W. J. Buxton. *Oil and Gas Journal,* v. 52, Oct. 19, 1953, p. 128-130, 132.

Uses and limitations of cast iron in petroleum refining equipment. Photographs. (T28, CI)

352-T. More Strength Less Weight. *Steel,* v. 133, Oct. 12, 1953, p. 130-134.

Applications of low alloy steels. Photographs. (T general, ST)

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Uses and limitations of boron steels. Photographs. (T general, J26, AY)

354-T. Stainless Steels. *Steel,* v. 133, Oct. 12, 1953, p. 146-148, 150.

Applications and properties of various stainless steels. Photographs. (T general, Q general, SS)

355-T. Light Metals. Aluminum, Magnesium, Titanium. *Steel,* v. 133, Oct. 12, 1953, p. 163, 166, 168, 170.

Applications and mechanical properties of Al, Mg and Ti. Photographs, tables. (T general, Q general, Al, Mg, Ti)

356-T. Heat and Corrosion Resistant Materials. *Steel,* v. 133, Oct. 12, 1953, p. 173, 176, 179.

Choice of proper material for extreme service conditions. Photographs, tables. (T general, Q general, SG-g)

357-T. (French.) **Frames of Prestressed Steel.** G. Magnel. *Ossature metallique,* v. 18e, no. 10, Oct:, 1953, p. 507-519.

Calculations and applications in a hangar at Melbroeck, Belgium. Diagrams, photographs. (T26, ST)

358-T. Cast Iron Brake Drums. E. C. Toghill and H. T. Angus. *Automobile Engineer,* v. 43, Oct. 1953, p. 409-418.

Developments in design and materials to cope with problems of heat dissipation and drum distortion. Photographs, diagrams. (T21, CI)

359-T. High Alloy Castings Resist High Temperatures. *Iron and Steel Engineer,* v. 30, Oct. 1953, p. 130, 134, 138.

Types employed and their applications in industry. Performances of each. Photographs. (T general, Q general, AY, SS)

360-T. Light Alloy Sole Plates for Flat-Irons. *Light Metals,* v. 16, Oct. 1953, p. 330-331.

Types of aluminum alloys and characteristics of each. Photograph, table. (T10, Al)

361-T. Whirling Its Way Into New Fields. *Steel Horizons,* v. 15, Fourth Quarter, 1953, p. 10-13.

Use of gas turbine in industry today and future applications. Photographs. (T25)

362-T. Fine Tungsten and Molybdenum Wire for Electron Tubes. I. C. C. Gee. *Wire Industry,* v. 20, Oct. 1953, p. 977-978, 980-981.

General survey of properties and applications of fine tungsten and molybdenum wire as applied to electron tube manufacture. Photographs, tables. 3 ref. (To be continued.) (T1, W, Mo)

363-T. India's Gold and Silver Thread Industry. *Wire Industry,* v. 20, Oct. 1953, p. 993, 995, 997.

Equipment and processing techniques. Photographs. (T29, Ag, Au)

364-T. (Pamphlet.) **Utilization of Manganese, Nickel, Cobalt, Tungsten, Molybdenum.** Kenneth H. J. Clark, Chairman. 94 p. 1951. International Materials Conference, Washington, D. C.

Examines all practicable measures of effecting the highest degree of economy in the use of Mn, Ni, Co, W, and Mo. Includes methods which could be adopted by industry for the economical and efficient utilization of these metals and their alloys. Use of substitutes and waste products are given special consideration. (T general, A8, Mn, Ni, Co, W, Mo)

365-T. (Book.) **Aluminium and Its Alloys in Building.** 76 p. 1953. Aluminium Development Assoc., 33 Grosvenor St., London W. 1, England. 3s.6d.

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Uses of Cu and its alloys in measuring and control instruments. (T8, Cu)

367-T. (Book.) **Modern Uses of Nonferrous Metals.** C. H. Mathewson, editor. 2nd ed. 530 p. 1953. American Institute of Mining and Metallurgical Engineers, 29 W. 39th St., New York 18, N. Y. $7.00. ($4.90 to AIME members.)

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113-V. Copper, Lead and Zinc. Their Future. Webster Hodge. *Battelle Technical Review*, v. 2, Oct. 1953, p. 111-112.

Applications and sources of Cu, Pb, and Zn. (Cu, Pb, Zn)

114-V. The Production and Properties of Tantalum and Zirconium. G. L. Miller. *Industrial Chemist and Chemical Manufacturer*, v. 29, Oct. 1953, p. 482-488.

Production of tantalum and zirconium and their application in the chemical industry with reference to corrosion resistance and mechanical properties.
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115-V. (Hungarian.) **Some Hitherto Undiscussed Properties of the High-Strength Al-Mg-Si Alloy.** Andor Benko. *Aluminium (Budapest)*, v. 5, no. 7, July 1953, p. 153-158.

Modifications caused by impurities encountered during the manufacturing process. Softening conditions, corrosion resistance, deep drawing capacity and adaptability to second rolling, fatigue limit, weldability and the probability of hitting the correct composition during production. Tables, graphs. (Al, Mg, Si)

116-V. Aluminum 218. *Alloy Digest*, no. Al-9, Oct. 1953.

Composition, physical constants, properties, machinability, castability, corrosion resistance and general characteristics of this die casting alloy. (Al)

117-V. Noral C77S. *Alloy Digest*, no. Al-10, Nov. 1953.

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123-V. Jalten. *Alloy Digest*, no. SA-12, Nov. 1953.

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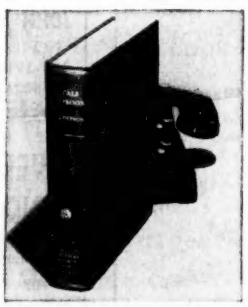

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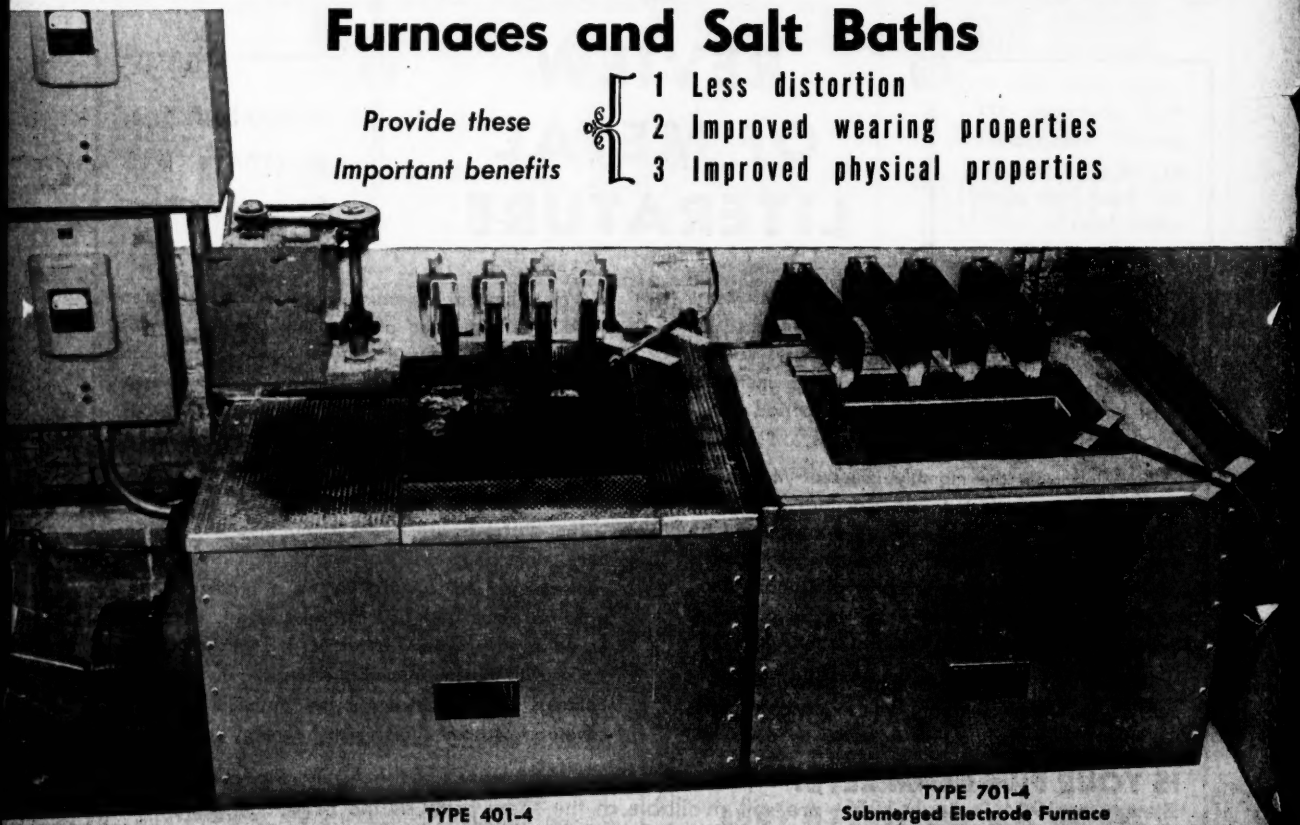

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